A CHILTON PUBLICATION

the Iron Age

NATIONAL METALWORKING WEEKLY

August 14, 1952

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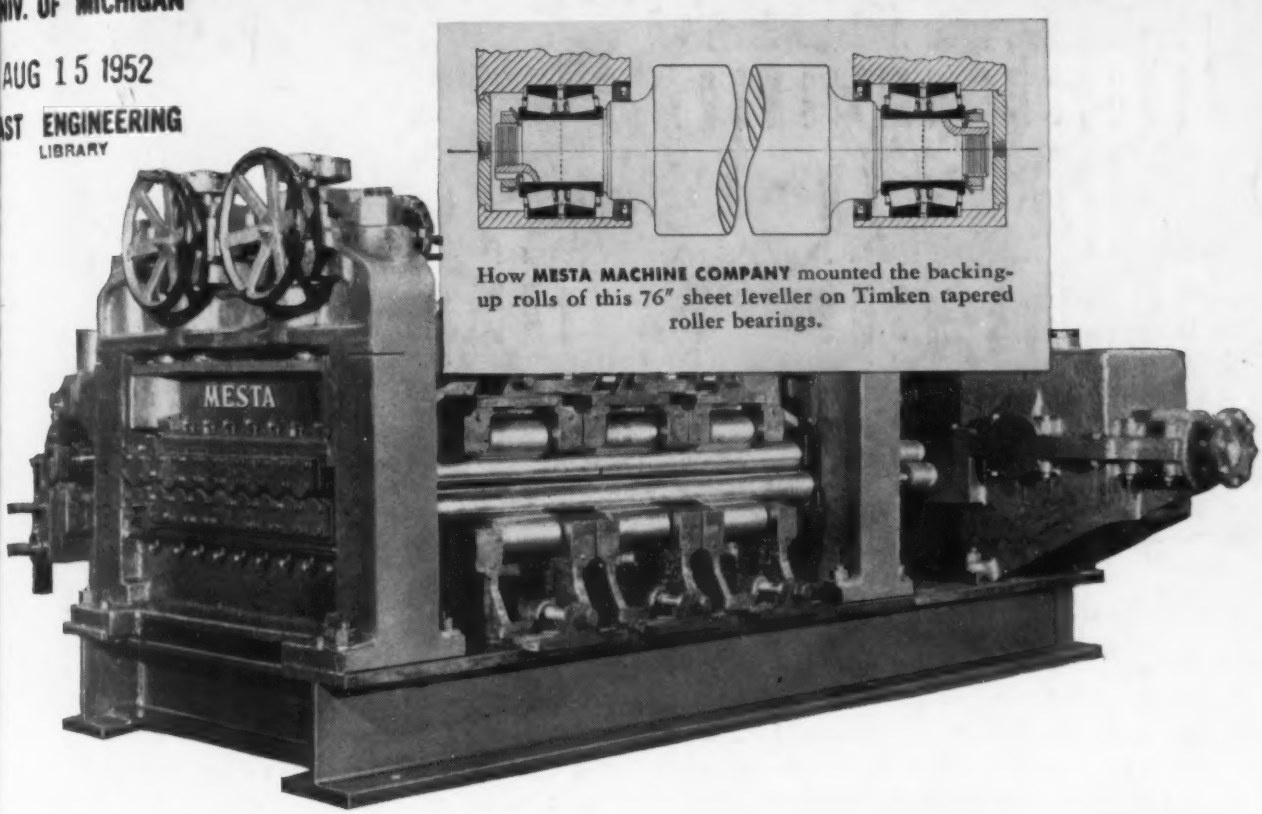

How **MESTA MACHINE COMPANY** mounted the backing-up rolls of this 76" sheet leveller on Timken tapered roller bearings.

More plate...less wait from leveller on TIMKEN® bearings

TO insure continuous sheet leveling production, Mesta Machine Company mounts the backing-up rolls of its spindle-driven levellers on Timken® tapered roller bearings.

Timken bearings hold shafts in rigid alignment. They reduce drag between rolls because of their true rolling motion and incredibly smooth surface finish. As a result, rolls start quicker even when subjected to terrific separating forces.

Due to their tapered construction, Timken bearings take both radial and thrust loads in any combination. Special thrust units are eliminated. And mounting or changing rolls is simpler, quicker.

Line contact between the rollers and races of Timken bearings permits extra load-carrying capacity. Because they hold roll and housing concentric, they make closures more effective. Lubricant stays in—dirt and moisture stay out.

Timken bearings are now used on the back up rolls of practically all levellers. Make sure the bearings in the machines you build or buy are stamped with the trade-mark "Timken". The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

NOT JUST A BALL ○ NOT JUST A ROLLER ⊂⊃ THE TIMKEN TAPERED ROLLER ⊂⊃ BEARING TAKES RADIAL ○ AND THRUST —○— LOADS OR ANY COMBINATION

How much heat from a "heat" of Chromel

You've seen molten metal before . . . but chances are you've never seen a "heat" that's more closely controlled as to composition and quality than the one you see above. For this is a heat of Hoskins Chromel . . . the *original* nickel-chromium alloy that *first* made electrical heating practical. Into it go precise amounts of the purest raw materials obtainable . . . mixed, melted, and poured in exactly timed cycles. And from it, ultimately, will come approximately 1200 pounds of fine finished material . . . smooth, bright, durable wire or ribbon produced to a specified resistivity for long, dependable service as heating elements or cold resistors in countless different electrical devices.

Chromel, however, is only one of many specialized, quality-controlled alloys developed and produced by Hoskins. Others include: Alloy 502 . . . used throughout industry for a wide range of heat resistant mechanical applications. Spark plug electrode alloys . . . which have become universally accepted standards of quality and durability. Alloy 717 . . . used in facing engine valves for longer life and improved service. And, of course, there are Hoskins Chromel-Alumel thermocouple alloys for industrial furnaces and jet engines . . . unconditionally guaranteed to register true temperature-e.m.f. values within close specified limits.

Heating elements made of Hoskins Chromel give long life service in industrial electric furnaces, home appliances.

Spark plugs equipped with Hoskins electrode alloys give long dependable service wherever they're used.

Hoskins Chromel-Alumel thermocouple alloys accurately register exhaust temperatures of jet aircraft engines.

HOSKINS

MANUFACTURING COMPANY

4445 LAWTON AVENUE • DETROIT 8, MICHIGAN

Chromel® NICKEL CHROMIUM WIRE

New Steelwork Enlarging These California Buildings

Monterey Bay Steelwork for the $30-million addition to the Pacific Gas and Electric Company's steam generating plant at Moss Landing. This new 300-ft-long structure will house two 100,000-kw generators.

The steel was fabricated and erected by Bethlehem Pacific. Erection of the boiler supports is under the direction of C. C. Moore Company. Prime Contractors are Stone and Webster Engineering Corporation.

Sacramento

New structure straddles the original Sacramento County General Hospital and adds four stories to the existing building. It has 150,000 sq ft of floor, and provides space for 480 patients.

The steel framework was erected by Bethlehem Pacific. General Contractors, Lawrence Construction Company and Edwin J. Mackey. Architect, George C. Sellon.

San Francisco Steel framework for the new 7-story wing of the Metropolitan Life Insurance Company offices. This will increase existing office and storage space by 125,000 sq ft. It will contain a bomb shelter with closed ventilation.

Bethlehem Pacific handled the steelwork. General Contractors: Cahill Brothers; Architects: Thomsen and Wilson; Engineer: H. J. Brunnier.

BETHLEHEM STEEL

BETHLEHEM PACIFIC
COAST STEEL CORPORATION

Structural Steel Fabricating Works: Los Angeles, South San Francisco, Alameda, Seattle

IRON AGE

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ABC AUDITED PAID CIRCULATION

Society of Business Magazine Editors

CCA Controlled Circulation Audit

NBP National Business Publications

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DIGEST

of the week in metalworking

ALUMINUM OUTPUT SURGES TO MILLION TONS

PAGE 81 Production of raw aluminum is gathering a huge head of steam, surging to the rate of 1 million tons per year. This will come about despite difficulties caused by storm damage to plants at Alcoa's Massena, N. Y., works and the steel strike. More aluminum capacity is coming in swiftly.

WAREHOUSE WOES FOR SMALL BUSINESS

PAGE 82 Small business which must rely on "department store" service from steel warehouses was sure to suffer because warehouse inventories were at a low ebb. Biggest problems afflicting warehouses are severe imbalance of inventory and conflicting government orders. One reserves steel for military.

SITDOWN STRIKE TO HALT PLANT MOVEMENT

PAGE 83 Chicago police hustled sitdown strikers out of International Harvester twine plant. The strike was the union's protests against relocation of the plant in New Orleans. While the company claimed it was moving to avail itself of cheaper water rates, union said cheaper labor was the motive.

APPLIANCE MAKERS STAGGER TO THEIR FEET

PAGE 84 Last week appliance plants were pushing back to a production half life. It seemed that it would take from 2 to 3 weeks before these plants could reach pre-strike levels. Tantalizingly, consumer demand was growing still stronger. Steel was scarce and added costs would boost prices.

CONVERSION MARKET HAS HEYDAY AGAIN

PAGE 85 Steel strike aftermath is flourishing of the once-waning conversion market. A vigorous market for from 3 to 4 months is certain. Backbone of conversion today is the auto industry. Users of oil country goods are playing all the angles while appliance makers cautiously enter the market.

HOW MUCH MORE WILL NEW AUTOS COST?

PAGE 100 Higher steel prices will hit Detroit automakers. What will their effect be on new car prices? Best guesses are that prices on 1952 models will not be lifted but prices of coming 1953 models would cost more. Meanwhile, crippled auto output was not expected to reach normal before end of August.

WILL PLANE, WEAPONS DESIGN BE FIXED?

PAGE 105 Military planners have been prolific with alibis on why designs of aircraft and some weapons have been fixed. But the freeze on designs is still in the talking stage and the fear of obsolescence keeps production plans in flux. Now the planners must make up their minds to facilitate output.

HOW TO USE CO_2 IN GRINDING CARBIDES

PAGE 123 Experiments with CO_2 as a coolant in toolroom grinding convinced Thompson Products Co. and Cadillac Cleveland Tank Plant that the new coolant is here to stay. Carbides can be ground faster with fewer heat cracks and less wheel wear. A central system distributes CO_2 at Thompson.

RESEARCH MAKES BETTER HEAT TREATING

PAGE 134 Production-type heat treating labs at Electric Furnace Co. produce advances in speed and quality of continuous heat treat operations. Research sets up operating methods which can be duplicated in field. Recently-installed equipment is capable of handling strip products in 500-ton lots.

WHAT TO KNOW ABOUT STRETCH FORMING

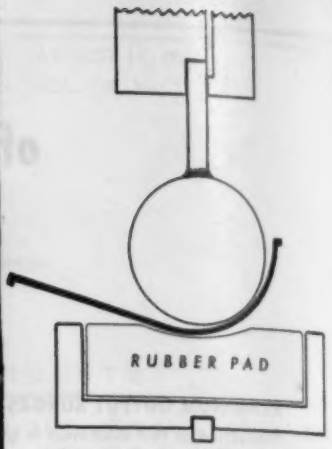
PAGE 138 The advantage of stretch forming is that there is almost no springback. The major disadvantage is that the ends of the work are marred and must be scrapped. Metal is stressed beyond yield point. Best materials are those with wide spread between yield point and ultimate limit.

FIRST QUARTER STEEL CARRYOVERS EXPECTED

PAGE 179 The steel shortage pattern is beginning to take shape. Despite expected high output from mills, civilian users will be able to place little new business this year. Fourth quarter quotas are subject to February delivery. This means a big carryover of orders into first quarter of next year.

REPUBLIC STEEL: NEW TITANIUM PRODUCER

NEXT WEEK Republic, which has rolled titanium ingot since 1948, now produces its own pure and alloy metal. Ingots are made by either arc or induction melting, and marketed in strip, plate, sheet, and forming forms. The Republic 7-pct Mn alloy has a yield strength ranging from 120,000 to 160,000 psi.



Slots cut in the rubber pad permit forming all length of ducts with preformed end seam flanges and eliminate hand forming.

Courtesy of Texas Engineering and Manufacturing Co., Inc.

FASTER... BETTER... and CHEAPER!

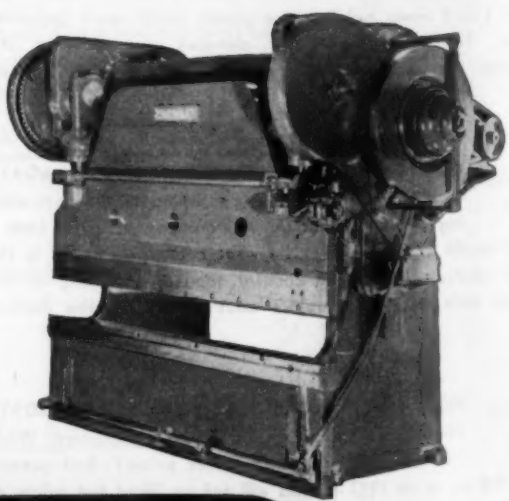
The speed and accuracy of this Cincinnati Press Brake—plus the smart engineering of Temco engineers—saved time and money while bettering the product.

Saving five to six minutes per section, flanged ducts for B-36 Heavy Bombers, ranging from 3″ diameter to 6″ by 7″ elliptical section, and from five to seven feet in length, were produced on one machine, without set-up interruption. Ducts are fabricated from 52S sheet stock ranging from .020″ to .051″.

The precision performance of the Cincinnati Press Brake permitted the use of sheets with preformed end flanges giving uninterrupted production on all diameters and lengths.

The Cincinnati Press Brake, the Brake of many uses, will give YOU faster, better, and cheaper production.

Write for complete Cincinnati Press Brake Catalog B2A—or consult with our engineering department on your forming problems.



CINCINNATI

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO U.S.A.

SHAPERS · SHEARS · BRAKES

The Iron Age
FOUNDED 1855

1 + 1 = 1

ECONOMIC STABILIZER Roger L. Putnam has a new system of mathematics. You add to one side of the equation but during the process the other side shows no change.

Mr. Putnam says the steel price rise will be absorbed (shared) by steel fabricators. Thus the person who buys things made of steel will pay no more for the end product.

Before we test Mr. Putnam's formula let's review a few things about the steel case. Steel wanted neither a price rise nor a wage increase. A one-sided WSB went through all ceilings with its steel wage recommendation. Three times Mr. Truman publicly went all out for the WSB findings and supported the union. At the same time he flayed steel leaders with ill-tempered words.

Mr. Putnam has said steel held a loaded gun at the head of government. Facts show the government and the union pulled a loaded gun on steel. The steel industry gained a $5.20 a ton increase. Since this includes about $3.00 a ton for allowable increased cost to July 26, 1951 (before the steel case) and 70¢ a ton for a rail tariff hike, the industry got mighty little to take care of a wage hike whose cost will go to 24¢ or 25¢ per hour ($5.00 a ton direct cost and $5.00 a ton indirect cost).

Now Mr. Putnam holds a gun at the heads of steel users. He suggests they all absorb and absorb so that the consumer will not feel any price increase. Of course fabricators will be forced to pay the steel wage pattern. The unions will see to that.

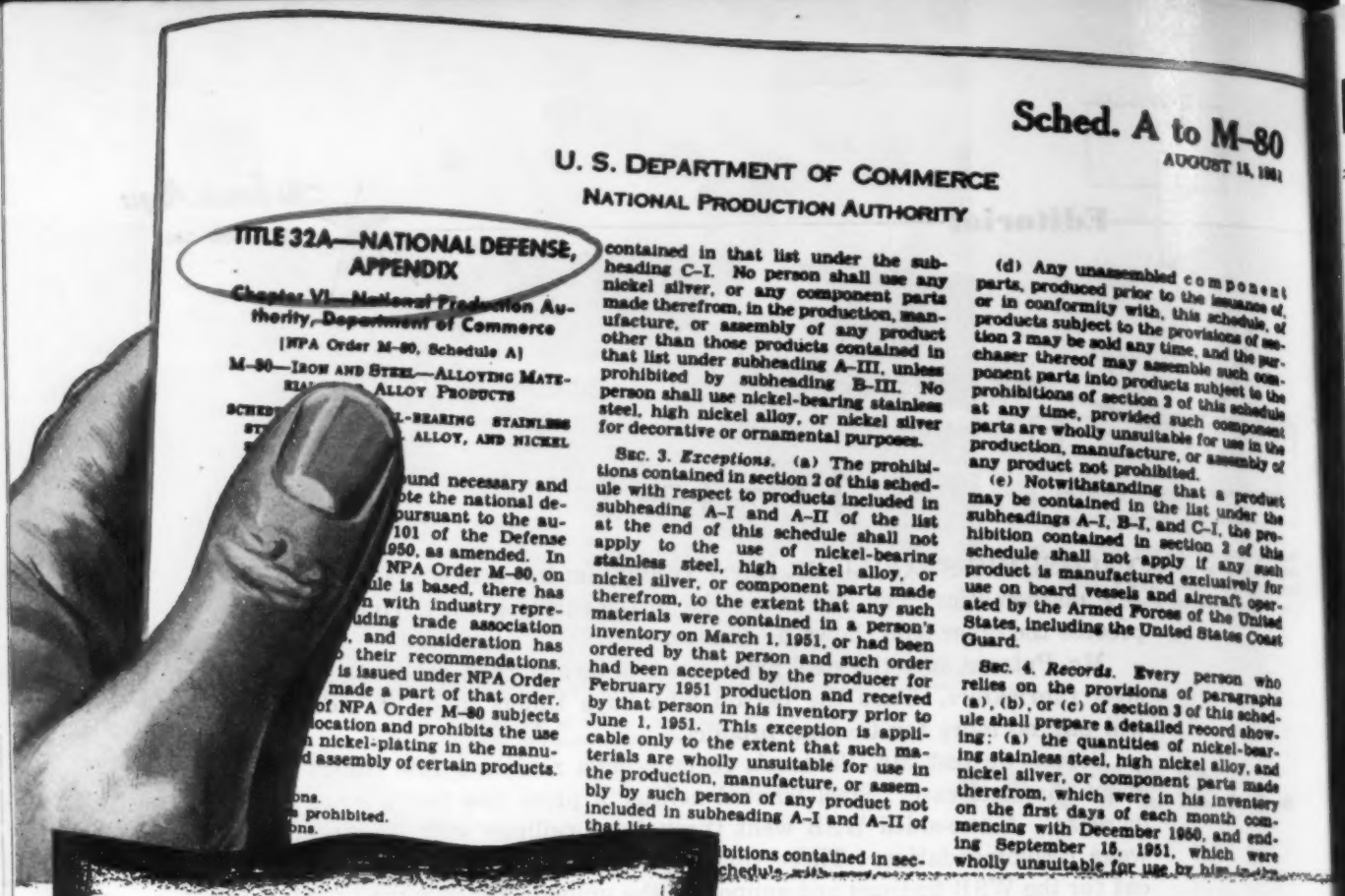
Where was Mr. Putnam when wage ceilings were being breached by union pressure, Administration help and one-sided WSB rulings?

So the customer pays no more? Who pays the loss in profits? The stockholder, of course, or the owner. That means he pays less taxes. Who pays the loss in government revenue if firms are forced to absorb higher costs, hence make less profit? The consumer, of course, because government must get its taxes. If less is collected the rate advances for all to make up for deficiencies.

Labor cost and taxes are a cost of doing business. According to Mr. Putnam $1 + 1 = 1$; but tested and old fashioned figuring shows $1 + 1 = 2$.

Tom Campbell

Editor



Sched. A to M-80

AUGUST 15, 1951

U. S. DEPARTMENT OF COMMERCE

NATIONAL PRODUCTION AUTHORITY

TITLE 32A—NATIONAL DEFENSE, APPENDIX

Chapter VI—National Production Authority, Department of Commerce

[NPA Order M-80, Schedule A]

M-80—IRON AND STEEL—ALLOYING MATERIALS AND ALLOY PRODUCTS

SCHEDULE A—NICKEL-BEARING STAINLESS STEEL, HIGH NICKEL ALLOY, AND NICKEL SILVER

...und necessary and ...ote the national de... ...pursuant to the au... ...101 of the Defense ...950, as amended. In ... NPA Order M-80, on ...ule is based, there has ...n with industry repre... ...uding trade association ..., and consideration has ... their recommendations. ... is issued under NPA Order ... made a part of that order. ...of NPA Order M-80 subjects ...location and prohibits the use ...n nickel-plating in the manu... ...d assembly of certain products.

...ons.

... prohibited.

...ons.

contained in that list under the subheading C–I. No person shall use any nickel silver, or any component parts made therefrom, in the production, manufacture, or assembly of any product other than those products contained in that list under subheading A–III, unless prohibited by subheading B–III. No person shall use nickel-bearing stainless steel, high nickel alloy, or nickel silver for decorative or ornamental purposes.

SEC. 3. *Exceptions.* (a) The prohibitions contained in section 2 of this schedule with respect to products included in subheading A–I and A–II of the list at the end of this schedule shall not apply to the use of nickel-bearing stainless steel, high nickel alloy, or nickel silver, or component parts made therefrom, to the extent that any such materials were contained in a person's inventory on March 1, 1951, or had been ordered by that person and such order had been accepted by the producer for February 1951 production and received by that person in his inventory prior to June 1, 1951. This exception is applicable only to the extent that such materials are wholly unsuitable for use in the production, manufacture, or assembly by such person of any product not included in subheading A–I and A–II of that list.

...bitions contained in sec... ...chedule ...

(d) Any unassembled component parts, produced prior to the issuance of, or in conformity with, this schedule, of products subject to the provisions of section 2 may be sold any time, and the purchaser thereof may assemble such component parts into products subject to the prohibitions of section 2 of this schedule at any time, provided such component parts are wholly unsuitable for use in the production, manufacture, or assembly of any product not prohibited.

(e) Notwithstanding that a product may be contained in the list under the subheadings A–I, B–I, and C–I, the prohibition contained in section 2 of this schedule shall not apply if any such product is manufactured exclusively for use on board vessels and aircraft operated by the Armed Forces of the United States, including the United States Coast Guard.

SEC. 4. *Records.* Every person who relies on the provisions of paragraphs (a), (b), or (c) of section 3 of this schedule shall prepare a detailed record showing: (a) the quantities of nickel-bearing stainless steel, high nickel alloy, and nickel silver, or component parts made therefrom, which were in his inventory on the first days of each month commencing with December 1950, and ending September 15, 1951, which were wholly unsuitable for use by him in the

IF YOUR PRODUCTION IS THREATENED BY THE CRITICAL MATERIAL CONTROLS

Is your product on this long list prohibited from using critical materials such as nickel-bearing stainless steel? Are you having difficulty obtaining aluminum or copper?

If you are, it will pay you to get all the facts regarding Sharon '430' Stainless Steel. This straight chrome stainless is the best available material today for many applications and has been used by hundreds of fabricators for thousands of products with great success. It has many of the qualities that have made stainless steel the most sought after metal today.

Sharon '430' is readily available with few restrictions as to end use. The Sharon Steel Corporation has prepared a special booklet giving information on Sharon '430'. To get yours, contact the Sharon office nearest you or write direct to ***Department 4852 — Sharon Steel Corporation, Sharon, Pa.*** Engineering help and technical assistance, too, available without obligation.

SHARONSTEEL

...YOU CAN CONTINUE WITH

Sharon 430 *stainless*

Dear Editor:

Letters from readers

Cutting Fluids

Sir:

I would like to obtain information relative to the effects of cooling or refrigerating cutting fluids on the machinability of metals.

The data we have been able to obtain on this subject is very limited. If you have published any articles dealing with this subject I would appreciate receipt of reprints.

W. H. MILLER
Metallurgist

Bowser Technical Refrigeration
Div. of Bowser, Inc.
Terryville, Conn.

Carbon dioxide is being used in increasing quantities as a cooling agent in cutting. The first documented article of the application of this gas to machining was published in THE IRON AGE, Apr. 17, 1952, p. 107, entitled "How To Machine Titanium." In our June 17 issue, p. 135, you will find more material describing the use of carbon dioxide for routing. We will soon publish two articles giving further information on application of this gas to other methods of machining.—Ed.

Nitrogen in Steelmaking

Sir:

On the Newsfront page of your July 24 issue a comment was made that the Russians have been able to increase tool life of high speed steels by using nitrogen in the steel manufacturing process.

As you may know, a special grade of calcium cyanamide supplied by this company has been used for the purpose of increasing the nitrogen content of steel, therefore, we would be interested in any further information which you can supply on the use of nitrogen in the steelmaking process.

E. N. CASE

Industrial Chemicals Div.
American Cyanamid Co.
New York

This information was based on a translation of an extensive Russian technical report. The translation has not yet been put on paper but we expect to be able to publish a full article on this subject this fall.—Ed.

Giant Presses

Sir:

We understand that sometime within the last year an article appeared in THE IRON AGE concerning large forging equipment in the United States. This article is said to have listed the forging presses of 15,000 tons and larger now in production in the United States and summarized the proposed equipment of this class.

The writer would very much like to read this article and will appreciate your furnishing the date of the issue in which it appeared.

C. H. SAVERY

French & Hecht Div.
Kelsey-Hayes Wheel Co.
Davenport, Iowa

The article is entitled "Presses: Giant Program Sails Ahead" which appeared on p. 85 of our Apr. 3 issue.—Ed.

Oxidizing Catalyst

Sir:

We refer to the first item on p. 53 of your June 26 issue regarding the Houdry oxidizing catalyst for the elimination of exhaust hazard on gasoline-powered industrial trucks.

We are very much interested in this and would appreciate your advising the firm marketing this item.

E. I. McKINSTRY
Asst. Purchasing Agent

Outboard, Marine & Mfg. Co.
of Canada, Ltd.
Peterborough, Canada

For more details write to the Oxy Catalyst Corp., Ardmore, Pa.—Ed.

Expansion

Sir:

We read the article "Fastener Industry Told to Grow" in your June 26 issue. We are very much interested in securing further information concerning this subject and would appreciate your telling us which government experts can be contacted for more details.

C. F. JENSEN
Manager, Special Products Div.

Shakeproof, Inc.
Chicago

For further information contact Edward K. Moss, assistant administrator for public information, National Production Authority, New GAO Bldg., Washington.—Ed.

Big Furnace

Sir:

Will you kindly forward six copies of the article "Big Furnace: Stress Relieving Furnace Able to Handle Big Weldments" which appeared on p. 143 of your Apr. 17 issue.

W. M. NOE

Industrial Power Equipment Co.
Philadelphia

Recovery Process

Sir:

We would appreciate receiving four reprints of the article "Alnico Recovery Process Salvages Valuable Nickel, Cobalt," which appeared in your July 3 issue.

A. B. STECK
Metallurgist

General Electric Co.
Everett, Mass.

which cold-rolled strip steel costs less "in the end"

- if variations in physical characteristics are permissible
- if fairly heavy oversize gauge variations are not objectionable
- if the fabricating operations are not too complicated and do not require intricate, expensive dies
- if a fine surface finish is not essential
- if a good base for paint or enamel is desired
- if you do not object to some "square footage" loss due to oversize variation
- *then Sheet Coil will probably be the most economical material for the job • • •*

• • • on the other hand—

- if you must have a high degree of uniformity of chemistry and physical properties—and precision gauge tolerances
- if you wish to avoid rapid die wear due to heavy oversize gauge variations
- if you require a fine finish or a better base for plating
- if you want maximum "square footage" for greatest parts yield per ton
- if you want selected tempers for maximum strength and lightest weight
- *then you'll find C. M. P. THINSTEEL far and away the most economical material.*

To be sure of getting the right steel, order "sheet coil" or "THINSTEEL" and be sure each coil carries an identifying tag. If we can help you select the right grade, just call on us.

THE Kenilworth Steel Co.
750 BOULEVARD
KENILWORTH, N. J.

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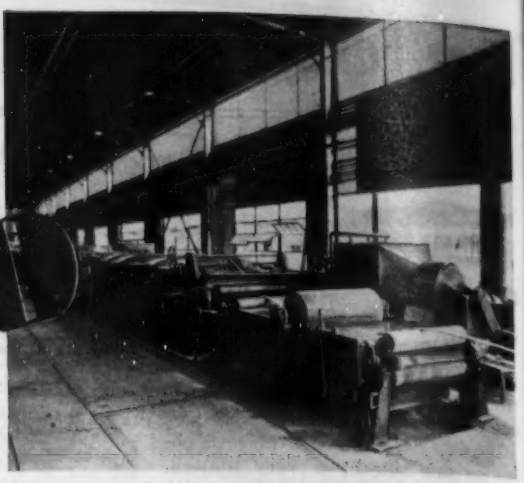
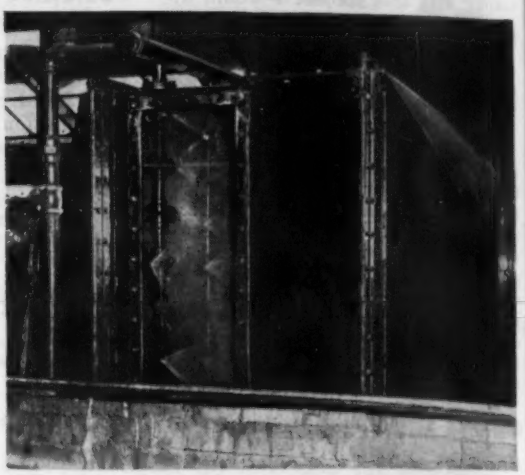
Teletype: Roselle, N. J. 387

Another Pickle Line Protected Throughout by PLIOWELD



TANKS and COVERS

WHEREVER metal surfaces are exposed to corrosive acids in this pickle line—tanks and covers, fume duct and scrubber equipment, exterior stack—protection comes from PLIOWELD—Goodyear's *permanent* anticorrosion lining of rubber bonded to metal. Every PLIOWELD installation is formulated especially by the G.T.M.—Goodyear Technical Man—to meet the exact demands of the job. To get his assistance with your corrosion problems, see your nearest Goodyear Industrial Rubber Products Distributor, or write Goodyear, Akron 16, Ohio.



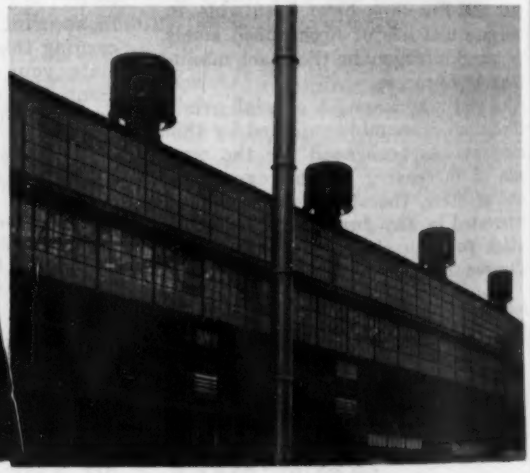
AIR WASHER REMOVING FUMES

GOODYEAR INDUSTRIAL RUBBER PRODUCTS

GTM -Specified USES FOR PLIOWELD

PROCESSING TANKS—rectangular, round, square • TANK COVERS—flat, box, radius types • STORAGE TANKS—open top, flat or dished heads • TRUNK TANKS • FLANGED PIPE • FLANGED PIPE FITTINGS • FANS—wheels and housings • DUCTWORK • SCRUBBERS—air purifiers • AGITATORS • CONTINUOUS VACUUM FILTERS • TROUGHS AND CHUTES • PUMPS • FILTER FRAMES • MOISTURE ELIMINATORS • MISCELLANEOUS FABRICATED ITEMS

PLIOWELD can also be used to combat abrasion



EXTERIOR STACK and BREECHING

GOODYEAR

THE GREATEST NAME IN RUBBER

Pliowald—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

Fatigue Cracks

by Charles T. Post

Super Service

Your f.f.j.'s Technical Editor, D. I. Brown, spends a good deal of his time on the road tracking down new technical developments. While lining up the big feature story for the Metal Show issue, he had occasion to stay in Columbus, Ohio, for a few days. The Fort Hayes Hotel, there, is noted for the excellent service it renders its guests, but Brown is still talking abut the service he received.

Before retiring the first night he switched on the room radio to be lulled to sleep by the music piped in from the hotel's main dining room. He also put in a call for 7:15 in the morning. Right at 7:15 the phone rang and a cheery voice bid him "good morning." One half hour later he was on his way to breakfast.

The next evening he repeated the same procedure and received the same phone call in the morning. This time he didn't get up right away. At 7:30 a charming voice came out of the radio, which was still tuned to the main dining room. "Mr. Brown," it said, "you asked for a call at 7:15. It is now 7:30 and you are still in bed. We were sure that you wanted to be reminded of the time and hope that you will have breakfast in the dining room."

Brown jumped out of bed but could discover no clue as to how the hotel knew that he had still been in bed. The window shade was drawn and the bed could not be seen from the keyhole. Time was short so he had to leave before he found the solution. And he is still trying to figure it out.

Vital statistics

Several weeks ago we used a puzzler about a grazing cow. The problem was to determine the area in which the cow could graze under certain conditions. We had hoped that some energetic puzzle fan would also figure out how long it would take an average cow to chew up all the grass in this area. No answer was forthcoming so we started digging into the matter ourselves. Among other things we uncovered a U. S. Dept. of Agriculture survey of how cows occupy their time. We learned that the average bovine, in 24 hours, among other things,

Spends 411 minutes in grazing, at about 50 bites per min.

Uses up 254 min. and 3083 yds. "just ambling around."

Lies down for 580 min.

For 195 min. does nothing in particular.

Puzzlers

In last week's race puzzler, John ran 11 yards per sec and Joe followed at 10 yards per sec. This appears to be rather fast even during an Olympic year.

The key to the Indian puzzle was, of course, that although the first Indian mumbled he could only have said that he was a Crow. C. B. Smith, Portland Copper & Tank Wks.; D. J. Rahn, Firth Sterling Steel & Carbide Corp.; S. Grubman, The State Metals & Steel Co., Inc.; F. B. Stubinger, Melvin F. Hall Advertising Agency, Inc.; R. Cooper, Westinghouse Electric Corp.; A. B. Retallick, New York; O. J. Mitchell, Jr., Union Steel Chest Corp.; J. T. Durkin, Institute For Trend Research; R. W. Huff, Canton, Ohio; L. D. Rice, The Timken Roller Bearing Co., and E. A. Schwab, Emerson Radio and Phonograph Corp., were on the right trail with this one.

Here is one you shouldn't have much trouble with. A railroad allows a passenger to carry a certain number of pounds of baggage without charge, and charges at a certain rate for all above that amount. Two passengers together have 350 lb of baggage, and are charged 25¢ and 50¢, respectively, for the excess. If the baggage had belonged to one of them, he would have been charged $1.25. How much baggage is one passenger allowed without charge? What rate is charged for the excess baggage? How many pounds did each passenger have?

Sugar-Coated

Some months ago Managing Editor, George Sullivan, presented a talk to the Metals Section of the Special Libraries Assn. on the subject of "Price Statistics on Metals." We had forgotten about the talk until we received the association's latest bulletin. In the write-up on the convention they had this to say about the talk. "Mr. Sullivan's extemporaneous explanation of how price statistics are acquired for such a journal as THE IRON AGE was so witty that the audience moved from one burst of laughter to the next, convinced that this was indeed the pill with the sugar coating."

With ELGIN DYMO at Hoskins, sizing is faster and cleaner, less polishing is required, and dies operate longer before resizing and repolishing is required!

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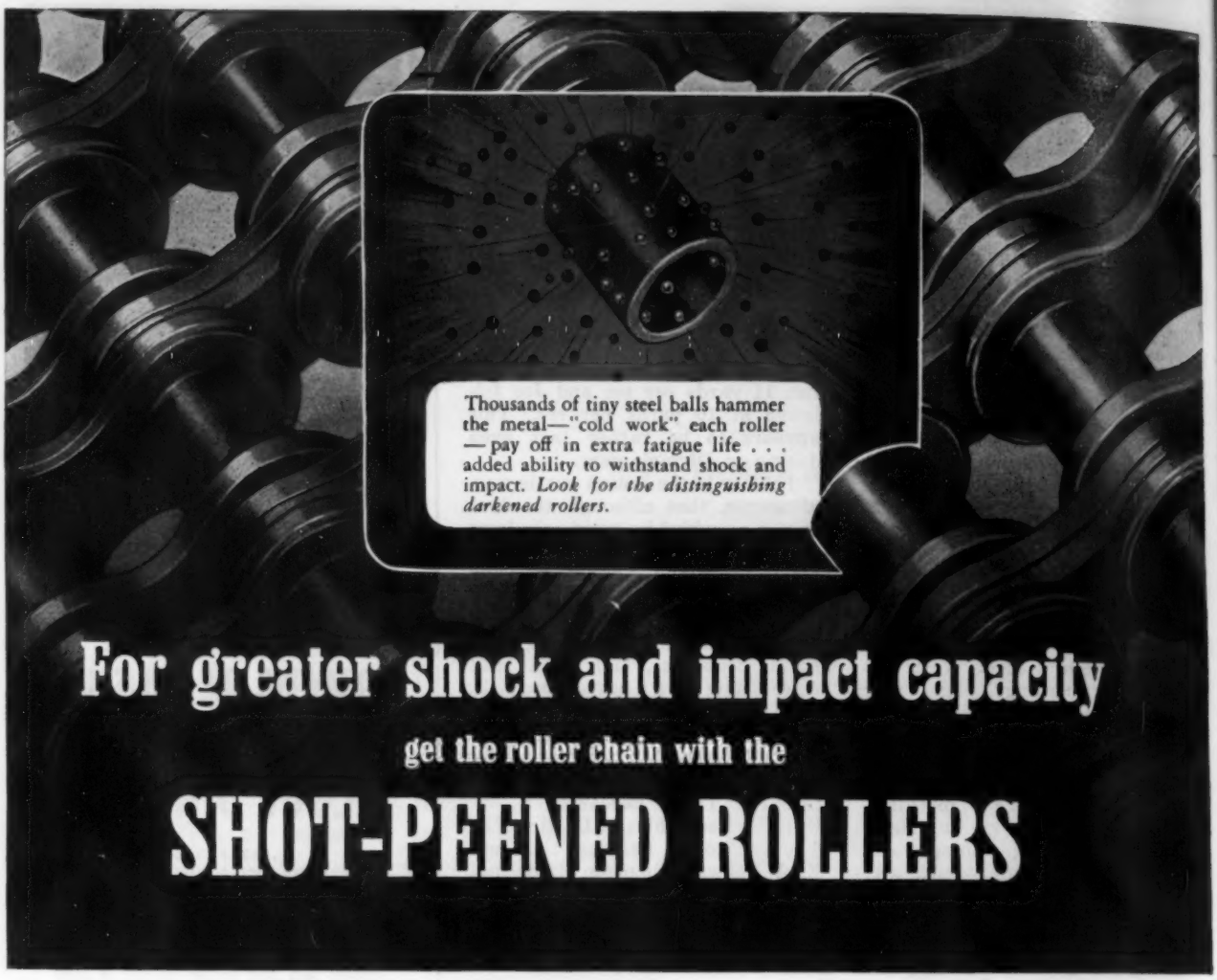
DYMO for General Polishing | DYMO-C for Carbides

ABRASIVES DIVISION, DEPT. B

ELGIN NATIONAL WATCH CO.

ELGIN, ILLINOIS


Thousands of tiny steel balls hammer the metal—"cold work" each roller—pay off in extra fatigue life . . . added ability to withstand shock and impact. *Look for the distinguishing darkened rollers.*

For greater shock and impact capacity

get the roller chain with the

SHOT-PEENED ROLLERS

. . . one of the extra-wear features you get with every LINK-BELT Roller Chain

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You can choose from the complete range of Link-Belt Precision Steel Roller Chain. Ask your nearest Link-Belt office for full particulars on single or multiple widths, in ⅜″ through 3″ single pitch, or double pitch, 1″ through 3″.

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The Iron Age
FOUNDED 1855

THE IRON AGE Newsfront

► A new way of annealing shells to be subsequently cold nosed is being tried by one manufacturer. He is fast heating with gas above the critical instead of annealing in salt below the critical. Result: same metallurgical structure, absence of detrimental scale.

► A producer of metal powder parts has designed his own shell molding machine which he will market soon. He also plans to install a small shell mold foundry.

► Possibility of building a steel mill in the West Indies is being investigated by private eastern interests with substantial capital. Facilities are planned to include an electric furnace and rolling mill to make bars and small shapes.

► Shortages of metallurgical coke continue to hamper German blast furnace production. Latest reports indicate some 30 furnaces are idle because of coke and fuel shortages. Ninety-three are operating. Germans are interested in trading one unit of scrap for four of coal from the United Kingdom.

► Bar steel may be tightest bottleneck in automotive steel supply. Shortage of this grade shut down the Chevrolet St. Louis shell plant which was a potent factor in ending the long steel strike.

► A new rotary type lawnmower to be introduced on the market soon will be made entirely of die castings.

► Despite increased steel costs and probably a cost-of-living wage hike at the end of September, price boosts on most autos may not come until debut of 1953 models. Although a car shortage is shaping up, automakers are reluctant to raise price tags at the end of the model year when stress is on cleaning up 1952's. A slight increase due to restoration of dealer discounts to the Mar. 1951 level may be passed on, however.

► British steelmakers are benefiting from the slump in ocean freight rates that have knocked nearly $60 million from value of shares in British tramp steamers. Six months ago the band was called out if even one old ship was broken up for scrap. Today three or four ships a week head for furnaces at much lower prices.

► Trade talk in coal circles harps unofficially on settlement without significant loss of output. Union leader John L. Lewis no longer ranks as one of labor's most militant chieftains. A coal strike would have to last more than 2 months before it could put the screws on industry. Stocks aboveground are now huge.

► Zinc deposits in Nepal are to be exploited by a new organization known as the Himalayan Syndicate in cooperation with India's Tata Iron and Steel Co. A preliminary survey indicates good ore in an area of 20 sq miles near Tiplin.

► Many scrap cast iron dealers have adopted a holding policy on their stocks. Anticipating increases in cast prices because of possible pig iron shortages, they are unwilling to sell at very low prices. Some users pay top prices for short periods.

► Carborundum Metals Co., Inc., subsidiary of Carborundum Co., has recently signed a contract with Atomic Energy Commission to produce 150,000 lb of zirconium and hafnium each year for 5 years.

DOW CORNING

Silicone Notes

ON LUBRICATION

REFERENCE NO. SL-53

FILE SILICONE LUBRICANTS

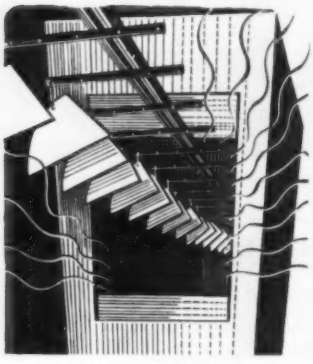
Make sure you have basic data sheets 8G-2, 5501b, 7102. If misplaced write Department O-20

DOW CORNING CORPORATION
Midland, Michigan

DOW CORNING 41 GREASE

Bearings working at 375°F. **in an oven conveyor system for baking the finish on electrical parts, failed frequently in spite of weekly relubrication. And many finished parts had to be rejected because of flaws caused by oil bleeding out of the bearings and dripping onto the uncured paint. Since using Dow Corning 41 Grease, bearing failure and rejects caused by melting grease have been eliminated, and the bearings have to be relubricated only twice a year.**

After more than 30 months of service, **conveyor bearings lubricated with Dow Corning 41 Grease are still running smoothly through an enamel drying oven operating at 300°F.**



Bearing failures have been eliminated, maintenance and lubrication costs have been reduced to the vanishing point; production has been increased by at least the $100 worth of parts a day that were formerly rejected because the finish was spoiled by the dried-up, graphite-kerosene lubricant that fell down from the bearings.

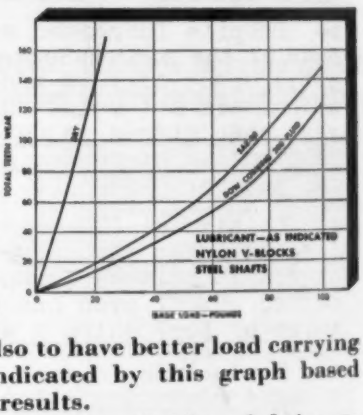
As an antiseize agent **on the die threads of glass forming machines, Dow Corning 41 Grease makes it easy to take dies apart even after 6 months of operation at 340-380°F. Similarly, die assemblies used in molding phenolic closures formerly froze so tight that a welding torch was used to cut the dies and bolts apart. The same assemblies lubricated with Dow Corning 41 are easy to disassemble after long exposure to heat and steam. Hold-down bolts on rubber and plastic presses are also lubricated with Dow Corning 41 to prevent seizure.**

DOW CORNING 200 FLUID

The ability to lubricate **is a complex of so many variables that no absolute value can be given for any lubricant. Speed and load, bearing design and metal combinations, time and temperature all have a more marked effect on wear than the lubricant itself has. That fact has been very well demonstrated in the case of the silicone lubricants.**

Take the Dow Corning 200 Fluids, **for example. Our first experience indicated that these fluids had little, if any, potential value as lubricants. That seemed to be true in spite of the fact that they have all of the other properties required of an ideal lubricant. They show remarkable resistance to oxidation and to gumming for an indefinitely long period of time and at high temperatures. Volatility is very low and they have an exceptionally flat viscosity-temperature slope.**

Further investigation **showed that the Dow Corning 200 Fluids are, in fact, excellent lubricants under certain conditions. They are, for example, the best of all lubricants for plastic and fiber gears and bearings. In this case, and unlike most silicone lubricants, the Dow Corning 200 Fluids seem also to have better load carrying capacity as indicated by this graph based on Falex test results.**



The superiority of these fluids **as lubricants for nylon gears and bearings is further indicated by the fact that wear should be more exactly defined as deformation due to the heat of friction rather than loss of material due to wear.**

DOW CORNING CORPORATION • MIDLAND, MICHIGAN

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The Iron Age
FOUNDED 1855
News Section

ALUMINUM: Capacity Passes Million Tons

Industry potential hits highest mark as new potlines start ... More coming in at rapid pace ... Year's output to set new record ... Steel strike slowed schedule—By R. L. Hatschek.

Production of raw aluminum is really getting up steam. New potlines coming into initial production so far this summer have pushed the nation's capacity a notch above the 1-million-ton-per-year mark. And, unless serious difficulties arise which are not foreseen at present, 1952 aluminum production will top a million tons for the first time.

First quarter total was 226,376 net tons, second quarter's was 235,160, and the third quarter should see 260,000 tons bettered. All this despite the loss of some 8000 tons of production during June and July because of extreme storm damage at the Massena, N. Y., plant of Aluminum Co. of America.

Set Back—Schedule of initial production from potlines now being built has had to be reshuffled as a result of the steel strike and other difficulties including power.

Reynolds Metals Co. is starting up the third and last line at Longview, Wash., this week, a delay of about 6 weeks from plan. The second and final potline at Reynolds' Corpus Christi, Tex., plant was slated for first production in July but will not begin operations until the end of this month. At Arkadelphia, Ark., the company hopes to bring in the entire Patterson plant by early June, 1953.

Alcoa's plans, before the steel strike, called for starting the second potline at Wenatchee, Wash., on Aug. 1—it isn't running yet—the third on Sept. 1 and the fourth on Oct. 15. The first three potlines at the lignite-powered Rockdale, Tex., smelter were supposed to start on Sept. 1, Oct. 15 and Dec. 15 this year with the fourth coming in on Feb. 15, 1953. Company estimates put the delay at 2 weeks to a month.

Allotments—Nor was Kaiser Aluminum & Chemical Corp. unaffected by the recent work stoppage. Second phase of the company's huge Chalmette works will be delayed at least the length of the shutdown and also depends on future government allocations of steel. This plant, to total 200,000 tons when complete, has eight potlines. Two are in operation and two more are virtually completed but the last four, comprising half the capacity, are included in the second phase.

Anaconda Copper Mining Co.-Harvey Machine Co. joint venture into the primary aluminum scene is not scheduled until late 1953. This plant, at Kalispell, Mont., will get its power from the still-incomplete Hungry Horse Dam.

Round Three—Defense Production Administration was expected to announce its plans for the third phase of the aluminum expansion this week. Increased imports from Canada, as originally proposed by the agency, will probably not enter into this round as a result of recommendations made by the Joint Congressional Committee on Defense Production (see THE IRON AGE, July 10, p. 174).

It is anticipated that this phase will be designed to bring reduction capacity to a level covering requirements in the event of total war. These needs have been mapped out by Munitions Board and will probably also include stockpile supply. But no figures have been divulged.

U. S. ANNUAL ALUMINUM CAPACITY (Net Tons)

Producer	In Place Aug. 1	Under Construction	Total Projected
Alcoa			
Alcoa, Tenn.	145,300	.....	145,300
Badin, N. C.	43,350	.....	43,350
Massena, N. Y.	72,000	.....	72,000
Pt. Comfort, Tex.	92,000	.....	92,000
Rockdale, Tex.	.....	85,000	85,000
St. Lawrence, N. Y.	55,000	.....	55,000
Vancouver, Wash.	76,100	.....	76,100
Wenatchee, Wash.	21,250	63,750	85,000
TOTAL ALCOA	505,000	148,750	653,750
Anaconda-Harvey			
Kalispell, Mont.	.....	72,000	72,000
Kaiser			
Chalmette, La.	50,000	150,000	200,000
Mead, Wash.	175,000	.....	175,000
Tacoma, Wash.	25,000	8,200	33,200
TOTAL KAISER	250,000	158,200	408,200
Reynolds			
Arkadelphia, Ark.	.....	55,000	55,000
Corpus Christi, Tex.	40,000	40,000	80,000
Jones Mills, Ark.	97,000	.....	97,000
Listerhill, Ala.	50,000	.....	50,000
Longview, Wash.	31,500	18,500	50,000
Troutdale, Ore.	82,500	.....	82,500
TOTAL REYNOLDS	301,000	113,500	414,500
TOTAL UNITED STATES	1,056,000	492,450	1,548,450

WAREHOUSES: Trouble for Small Firm?

Inventories at lowest ebb since statistics-keeping by warehouses began . . . Woe shapes up for little company . . . Unbalance worst problem . . . Orders clash—By W. V. Packard.

Steel warehouse inventories are at their lowest ebb since the industry started keeping inventory records in 1949. This spells plenty of trouble for small business in the months ahead because the little companies get most of their steel from warehouses.

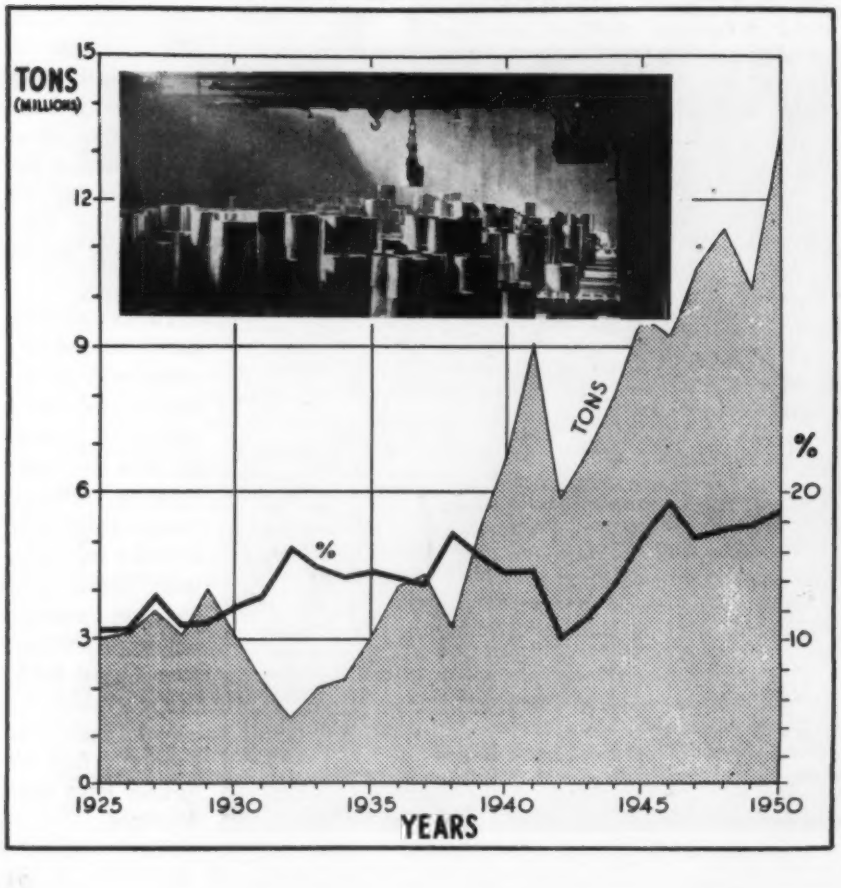
To make matters worse a maze of frustrating and sometimes conflicting orders from Washington is hamstringing warehouse efforts to provide service.

Depleted inventories were spotlighted at a meeting of the New England chapter of American Steel Warehouse Assn. last Thursday. The warehouse role is particularly vital in this area because of the number and diversity of small plants that need "department store" steel service. Walter S. Doxsey, ASWA president, predicted tough sledding for warehouse customers through the first quarter of next year.

Gain Abolished — Steel inventories in warehouses are now about 36 pct of what they were in September of 1949. This is 1 pct lower than the previous critical point reached last September. Strenuous efforts over a long period had succeeded in bringing inventories up to 63 pct of the 1949 level just before the strike. Now, that hard-won gain has been more than wiped out by the steel strike.

Steel Mill Shipments to Warehouses

by Tonnage & Pct of Total Shipments



But unbalance is the most serious part of the warehouse inventory picture. Warehouses report they are completely out of more than half the items they normally stock. This cripples their service. It is no wonder they are alarmed over their own business prospects as well as those of the small companies they serve.

Conversely, inventories of some items are up to 75 pct of "normal". This is slight balm because these products are not the ones generally in strong demand.

Basis of Statistics—The American Steel Warehouse Assn. first started keeping inventory records in 1949. Sept. 1 of that year is used as their base. Their figures are compiled from reports from 200 warehouses handling about 60 pct of warehouse tonnage. This is the first time details of their inventory statistics have been fully revealed.

The inventory base, which the association calls "normal", was a period of good (but not booming) steel business. Mills were operating at about 85 pct. With manufacturing at a much higher level today, a normal warehouse inventory would probably be much higher than this arbitrary base.

Gaps in Bays—Reporters were given first hand examples of typical warehouse operation and inventory level in two plant tours on "steel row" in Cambridge, Mass. Warehouses visited were Brown-Wales Co. and Ward Steel Co. Both these modern steel service centers were built in 1950.

Equipment, materials handling methods and overall service are impressive. But so is the lack of inventory. There are great gaps in the storage bays where heavy plates and structurals, large bars and nickel bearing stainless should be found. Light flat-rolled items, small bars, mechanical tubing and wire products are in better supply.

Mr. Doxsey charged that the government was doing anything but helping to clear warehouses

confusion resulting from the steel strike and conflicting government allocation and priority orders.

Most Irritating—Two orders stand out as particularly annoying to the trade. One compels warehouses to hold 50 pct of each steel shipment for 15 days until military and atomic energy users have had first crack at it. This immobilizes a 50 pct set-aside. Yet military and AEC use normally accounts for no more than 10 pct of warehouse business. Meanwhile, service is denied to many small firms that need steel. This is only slightly less disruptive than recent complete embargoes.

Of course this requires extra bookkeeping. And at least half of each shipment has to be tagged separately so it can be determined when the 15 days set-aside time has expired.

Warehouse Inventories

(200 Warehouses, representing about 60 pct of tonnage)

Date	Net Tons Inventory	Inventory Pct of/Base
Sept. 1, 1949	1,115,000	100
Sept. 1, 1950	790,000	71
Sept. 1, 1951	415,000	37
June 1, 1952	700,000	63
Aug. 1, 1952	400,000	36

Source: American Steel Warehouse Assn., Compilation THE IRON AGE.

The other confusing order is on prices. (THE IRON AGE, July 10, p. 93.) This order also involves reams of extra bookkeeping and red tape—all of which is separate from other records.

Unrealistic Base—Several warehousemen privately admitted that these orders present an enigma. Strict compliance may not be impossible, but is nearly so.

Warehousemen insist the base on which their share of mill steel is allotted is unrealistic. Many of them were correcting inventories then. They point out that the 120 pct of base to which they are now entitled is not as good as it may sound.

That is actually less than they got during the first 5 months of this year when the warehouses got nearly 20 pct of mill shipments.

Strikers Protest Relocating Plant

With pickets snapping at their heels Chicago police barged into International Harvester twine plant to hustle out sitdown strikers protesting removal of the plant to New Orleans. Battle cry of police was voiced by the captain in charge: "This is private property. You would not allow strangers to trespass in your homes. You can't be allowed to trespass here."

The union, Farm Equipment Workers, UE, Local 141, was fighting bitterly last week against departure of a valued source of employment. Included in the bag of strikers carted in patrol wagons to the station house was the president of the union.

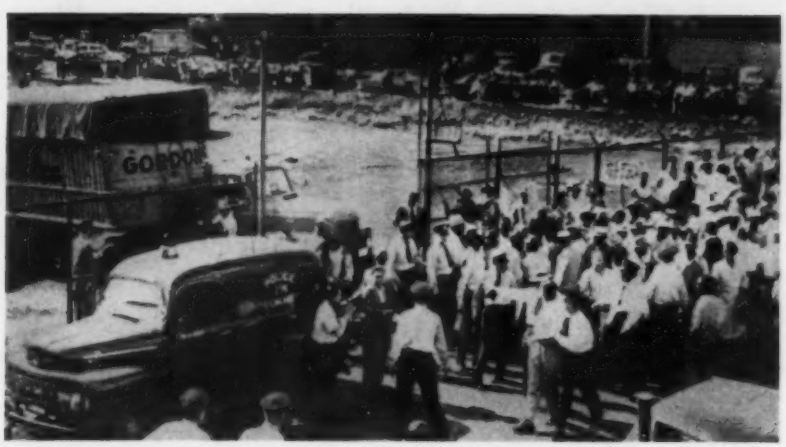
The union charged that International Harvester was moving its twine shop southward to take advantage of cheaper labor. The company denied this, replied that labor is only 10 pct of costs but 80 pct are represented by freight and handling. A New Orleans plant site would furnish better water freight rates and pare cost of hauling in raw materials.

International Harvester had a twine mill in New Orleans in a leased government building. Twine making was discontinued when the government took back its building during the war. Another building was put up and Chicago machinery is being shipped there.

ARREST: Police remove a picket trying to prevent removal of equipment from International Harvester's Chicago twine plant.

The firm claims it notified its 850 workers of the impending move 2 years ago and has kept them alerted since. It even offered to pay severance pay.

Meanwhile, at the Terre Haute, Ind., jet engine plant of Allis-Chalmers strikers got violent and halted construction of a building that would employ 4000 when finished. Near completion was a pilot plant for manufacture of Sapphire jet engine parts. Strikers halted work on this one, too.



BREAK IT UP: Pickets battle with police trying to break up roadblocks. These were set up to keep trucks from removing equipment from International Harvester's twine mill on Chicago's South Side for shipment to a New Orleans factory site.

APPLIANCES: Rallying Back to Life

Producers still in the cutback stage . . . Plants returning to activity . . . But won't reach pre-strike levels for at least 2 or 3 weeks . . . Demand is perking up—*By K. W. Bennett.*

Two weeks ago the appliance field was strewn with the fallen.

One large concern had cut back 10 pct, was waiting hourly for the word to cut back further. In the same vicinity, two large firms had suspended production entirely. A fourth plant was off 40 pct in one line and 75 pct in another. It would take some time before production lines in those plants would be fully active, experts reckoned.

Last week these plants were reawakening to activity, but it appeared that the production savants had been correct. It would take 2 weeks, possibly 3, before the flow of washers, ironers and other housewifely aids would reach pre-strike levels. What was more to the point—it also appeared that the production cutback was reinforcing the warmer consumer demand that had already been noted just prior to the steel strike. At that time, a slight upswing in sales was being watched hopefully.

Looking Up—For the appliance manufacturer there were several auguries for a brighter '53. Servel, at Indiana, announced confidently that, steel strike or no, their third quarter production would be the largest in recent years.

At South Bend, Ind., Bendix Corp. said planned '53 production would exceed '52 production by 10 to 20 pct.

Manufacturers generally were accepting the sales upswing of 1952's third quarter with more solid enthusiasm. Distributors had first watched the upcurve with ill-concealed distrust. They continued to cut inventories, getting them to a minimum and holding them there.

But with production stopping and sales curves holding, a gayer note has crept into appliance plans. Manufacturers are beginning to feel that high distributor inventories have been melting. Some backlog of demand is beginning to build again. Which would mean a good sales close for '52, and a cheerier sales opening for '53 than manufacturers had been previously led to anticipate.

Troubles—With new hope came new problems. The cold-rolled steel that had been coming into better supply was again scarce. Prices would be forced up by an increase in basic steel costs, possibly higher labor costs, and increased use of expensive conversion steel.

Use of conversion steel in late '52 and well into '53 is becoming an accepted fact among appliance producers. A number of firms who have ingots and hot-rolled sheet on the back shelf are waiting the chance to use it. But as one owner of a parcel of unconverted ingots put it, "We've got the ingots all right, but now we are having trouble locating a mill that can give us conversion time in their rolling schedule at a time when we want to have the finished steel."

One production executive dourly predicted a steel shortage through all of 1953. He has ingots, has some conversion capacity booked, needs more, hasn't been able to make satisfactory bookings thus far. Majority of producers con-

STEEL PRODUCTS USED IN ELECTRICAL APPLIANCES

Shipments to Electric Appliance Industry Shown in Net Tons From 1947

Item	1947	1948	1949	1950	1951	1952 1st Q'r'r
Ingots, blooms, billets, slabs, sheet bars, and seamless tube rounds	2,092	99	7	236	2,025	.....
Wire rods	465	178	142	127	139	.....
Structural shapes	1,376	3,321	1,890	1,237	1,327	478
Plates (sheared and universal)	10,417	8,915	6,205	7,428	9,694	1,537
Bars:						
Hot-rolled	14,716	12,567	9,648	16,375	22,650	6,580
Cold-finished	44,412	53,609	33,941	47,163	40,225	8,863
Tool steel	35	19	4	3	683	25
Pipe and tubes:						
Mechanical tubing	10,359	5,493	3,818	7,212	9,555	2,981
Pressure tubing		6,039	2,996	7,888	3,543	2,093
Standard pipe		13,567	8,756	12,380	11,057	1,995
Line pipe	16,371	382	114	459	206	41
Misc. tubular products		2,910	1,156	.....	.....	.....
Wire:						
Drawn	21,744	30,741	24,512	38,743	45,400	9,496
Nails and staples	47	559	269	472	651	37
Barbed and twisted	.....	4	.....	.....	.....	.....
Black plate:						
Ordinary	8,738	10,699	6,914	10,885	64,441	12,963
Chemically treated	12	8	.....			
Tin and ternplate:						
Hot dipped	1,237	1,696	1,470	861	10,265	1,097
Electrolytic	1,938	548	290	849	13,074	3,445
Hot-rolled sheets	307,067	363,015	197,288	301,818	244,792	33,594
Cold-rolled sheets	534,642	758,649	575,563	915,799	917,631	212,651
Galvanized sheets:						
Hot-dipped		39,696	29,149	74,126	75,182	17,062
Electrolytic	70,939	26,048	16,123			
Coated sheets—all other		2,423	2,008	21,285	27,920	5,276
Electrical sheets and strip	3,316	26,240	14,663	34,063	24,776	4,095
Enameling sheets	147,767	187,482	112,733	173,655	129,914	31,711
Strip:						
Hot-rolled	32,045	28,790	17,643	22,963	25,406	5,226
Cold-rolled	63,288	98,888	100,937	119,729	156,251	32,915
All other	.....	3	.....	.....	.....	.....
Total steel products	1,293,023	1,682,618	1,168,239	1,815,756	1,836,807	394,161

Includes cooking stoves and ranges, refrigerators, washing machines and ironers, and other household appliances. Source: American Iron and Steel Institute.

tacted were expecting steel supply troubles into at least mid-'53.

Bars Worst—All agree that if cold-rolled sheet and hot-rolled sheet are tough, cold-finished bars will be worse. Bar supply, unlike sheet, has never caught up with demand. Military use has increased and gives every indication of holding up.

And cold finishers are still carrying backlogs, have hit bottlenecks in their annealing as well as their cold finishing capacity. One cold finisher indicated that he has unfilled orders on his books dating back to April of this year. And he doesn't expect to have working stock in his shops in any quantity for at least 2 to 3 weeks after steel mills reach full production.

CMP Fears — There could be trouble for the appliance builder from another source. More than one producer expects some kind of CMP statement cutting the amount of steel available for his type of production. Such an order will make steel supply a strangling proposition in the late third quarter of this year and into winter.

On the other hand, few appliance producers have totally exhausted inventories. Nearly all have some kind of supplies on hand, have kept their production pipelines filled in anticipation of the return to work. Of raw steels, most seem to have 2 to 6 weeks working supply. Actual plant shutdowns stemmed primarily from shortages of finished components.

Artillery Shell Supply Critical

Small-arms ammunition supplies should be available in quantity, according to Acting Army Secretary Karl R. Bendetsen, but the flow of mortar and artillery shells has been placed in a "critical situation" because of the recently-ended steel strike.

The Pentagon official said "stoppages and slowdowns in vitally necessary ammunition production have lost a conservatively estimated 37 pct of the expected production for the present fiscal year."

STEEL: Conversion Market Booms

Strike-caused shortage promises flourishing demand well into '53 . . . Auto industry biggest user . . . Appliance makers cautious, but see handwriting on wall—By *J. B. Delaney.*

One aftermath of the steel strike is a flourishing conversion market.

How long it will last is anybody's guess. A strong market for 3 to 4 months is a certainty. Chances are good that many consumers will be forced to depend on conversion during part of the first quarter of 1953.

Mainstay of the market is the automobile industry. Car producers and their suppliers jumped in with both feet early and are playing the field for all it's worth. Appliance people are in it, too. But not so strong as automobile manufacturers. (See p. 84.) Consumers of oil country goods are another important factor.

Cautious—While appliance makers have been rather cautious to date, they are gradually becoming convinced that chances of getting enough steel from normal mill sources during 1952 are remote.

One large appliance maker believes that 20 pct of his requirements for most of next year will come from conversion and foreign sources. He plans to send a team of buyers to Europe shortly to line up steel for delivery in the first quarter of 1953. Market thus far is not so hectic as it was following outbreak of the war in Korea. At that time, steel consumers could foresee a long-range demand for their products and were willing to pay premium prices to keep operating. Today, the long-range picture does not appear to be so bright, but demand may be rising.

Holding Back — Consequently, some consumers who were major factors in previous conversion markets are holding back. Some appliance makers are in this group. They are not ready to take the plunge. Others are counting on increased steel capacity and inventory restrictions imposed by National Production Authority to make more steel available to more consumers.

Conversion costs are running double, sometimes triple, regular mill prices. Principal items are extra wide sheets, bars, and forging billets.

Consumers are paying as much as $110 for ingots. In a few instances even higher prices have been paid. Average is around $100. Actual price per ton is closer to $150 since the consumer receives only an average 70 pct yield from the ingot after conversion.

WATCH YOUR HAT, COAT, BRIEF CASE and LANGUAGE
SPEAK ONLY WHEN SPOKEN TO
PLACE ASHES IN TRAYS PROVIDED
BE BRIEF
DON MOE SALES MANAGER PRIVATE 15 MINUTE TIME-LIMIT
WATCH YOUR STEP
WIPE YOUR FEET!
Gloeckler

Just Beginning—Once the buyer has his ingot broken down into a slab, bloom, or billet, his cost problem is only beginning. Next step is to have the steel converted, in the case of a slab, to hot-rolled and perhaps by another mill to cold-rolled. Freight costs due to shuttling from one mill to another are terrific.

One consumer estimates his steel cost during the present emergency might run about $25 per ton more than he was paying before the steel strike wiped out close to 19 million ingot tons of production.

STEEL: Europe Wants Customers

Empty order books, new capacity strengthen threat of surplus . . . Little hope for sales to U. S. . . . Producers look to Russia, who isn't buying . . . Japanese competition growing.

European steel producers are looking hungrily for customers.

Order books are lean, and new capacity strengthens the threat of a surplus. Enormous postwar reconstruction demand started tapering off in 1950, but mills were able to keep busy through 1951. Now the honeymoon is over. Even the trouble in Korea had little effect.

Exports to this country are little more than a fond hope. The steel strike did bring a few rush U. S. orders, but these were a drop in the bucket. German steelmakers are vigorously opposed to accepting ordnance orders, once a staple of their business. Even if they change their minds it would take at least 2 years to re-establish the once great German armament industry.

Look East—Producers are saying more and more they must do business with the East or face plant shutdowns. They're emboldened in their stand by Washington's recent futile protests to Denmark over delivery of a tanker to Russia. And Washington has so far blacklisted only German firms for trading with the East.

DAVUM recently sold about 30,000 tons of French rails to East Germany. Deal went almost unnoticed because of lack of Washington reaction. When queried about this by THE IRON AGE, State Dept. officials replied blandly, "No comment."

But will Russia buy? Iron Curtain steel expansion has been formidable, and steel purchases from the West are few and far between. Russia will buy machinery, and equipment, but not steel, even alloy grades. It stopped buying roller and ball bearings in 1951.

Japanese Headache — Another headache to European steelmen is Japanese competition. Reports have been exaggerated, but the threat is still there. Japanese sales in Europe in 1951 totaled only 11,200 tons, but in first half of 1952 sales were over 14,000 tons. Final figure for this year is expected to be three times greater than last year.

While volume so far has been no real competition, Japanese prices are considerably lower. Last sale of ¼-in. wire rods to Italy was priced at $102 per ton, c.i.f. Genoa. This is about 8 pct below going prices.

It is interesting that sales to Europe were largely in wire rods, while elsewhere rods were insignificant. Japanese producers are now trying to boost European business in plates and structurals.

European Steel Surplus

Excess of finished steel production over the new orders first half 1952, in tons:

Great Britain	321,000
Germany	697,000
France	178,000
Belgium/Luxemburg	382,000
Italy	33,000
Austria	52,000

Steel Denationalization Planned

The British Government is moving to denationalize the steel industry. A bill to come before Parliament early next session provides for return of nationalized companies to private industry.

Public supervision of the iron and steel industry would be maintained under the law. A 12-member board would control capital development, fix maximum prices and take care of raw materials distribution.

British steelmakers favor the bill, but the Labour Party can be expected to fight it tooth and nail. British Iron & Steel Federation told THE IRON AGE it believed denationalization and resulting competition necessary for the future health of the industry.

EXPANSION:

Austrian iron, steel capacity, finishing facilities increase.

Austrian output of both pig iron and steel last year passed the million-ton mark. Iron production was 1,049,438 tons and steel ingots 1,027,793 tons. Operation of a new blast furnace at Linz was a major factor in reaching these production goals.

Iron ore output was raised 27.5 pct to about 2.4 million tons. In his presidential address to Austrian Iron & Steel Institute recently, Dr. J. Oberegger praised Marshall Plan aid for making this possible.

Lack of scrap forced mills to cut amounts used in blast furnace burdens and openhearth charges. Some 18,000 tons of calcined ore was swapped with West Germany for scrap.

Most of the blast furnace coke was supplied by the Linz ovens, with coal from the Ruhr and the U. S. About 20 pct of the total coke used was imported, mainly from the Ruhr. A small quantity was brought in from Czechoslovakia.

On completion of the new bessemer shops at Linz and Donawitz, Austrian steel capacity will be raised 300,000 tons to a total of 1.3 million tons.

New Steel Melt Shop Completed

First steel will be poured this week in the new melt shop at John Summers & Sons, Ltd., Shotton, Chesire, England. Shop is part of a $47.6 million development program, now nearing completion.

First of two new 44-oven coke batteries will start up in early October, and a new 27-ft hearth blast furnace will be blown in December.

How to Make Coal Mining Safer

Coal mine safety is the subject of continuous study by Bureau Mines. At its experimental mine at Bruceton, Pa., the bureau rks out new and safer techniques. Many of these are in use Consols Mine No. 32, Owings, W. Va., where these pictures re taken.

Mine explosions get the headlines, but roof cave-ins have killed re miners since 1906 than all other types of accidents combined. cidents during hauling are the number two killer.

Coal dust is an ever-present danger, however. Bureau of Mines periments have shown that some explosions occur at a speed about 5000 mph. Spraying has proved an effective deterrent.

BOOM: Top Right: In a study of coal mine explosions, Bureau of Mines officials ignite coal dust with a hot spark. Test showed that some explosions occur at a speed of 5000 mph.

CK IN TIME: Large sections of the roof fall as a miner ts with a pick. Chunks such as these cause many deaths.

NO CAVE-INS: Right: Mechanical drill cuts holes for insertion of roof bolting, a recent technique developed to make mine roofs safer. Miners wear masks to protect lungs from rock dust.

UST DOWNED: To limit possibiity of an explosion, a miner sprays oal dust with water in Consol Mine No. 32, near Owings, W. Va.

DUST CONTROLLED: Rock dusting machine is used daily in the mine to spray powdered limestone to make coal incombustible.

STEEL:

Users of 600 tons or less will get self-allotment right in 1953.

Beginning with first quarter 1953 a large segment of manufacturers will not have to file applications for controlled materials. They will be given self-allotment authority.

Officials have confirmed that steel consumers whose third-quarter carbon steel allotments were only 600 tons or less would be relieved of filing applications if they would be content with the same amounts for the first quarter.

Up to now, self-certification has been the only way to get controlled materials without formal allotment. This was good for 60 tons or less.

Same provisions are to apply to requirements for alloy, nickel bearing, and other critical types. The tonnage yardstick for these had not been decided, however.

Also Covers — This procedure would apply to copper, aluminum, it was said. It was understood that consumers would be allowed to issue their own allotments, under the same conditions as for steel, up to 40,000 lb per quarter for copper and 60,000 lb for aluminum.

One reason for the change is the increasing supplies of the three materials. Another is to bring a reduction of paperwork, since National Production Authority is laying off 20 pct of its staff.

Still a third reason is believed to be that Defense Production Administrator Henry H. Fowler wants to make good on his promise to lift as many controls as possible before he quits late this year.

All manufacturers of "B" products will be mailed instructions on how to make use of the self-allotment privileges along with their regular 4-B applications.

Inventory Curbs to Be Enforced

A nation-wide program to enforce compliance with the new 30-day steel inventory rules is being launched by National Production Authority.

It is hoped the program will bring substantial cancellations of orders now on mill books. Some officials believe steel inventories now run as high as 15 to 18 million tons.

Enforcement will be achieved by flying squads set up in Washington. But compliance depends mainly on voluntary cooperation by industry. Reduced appropriations have brought a cut of 40 pct in NPA enforcement personnel.

Since the lower inventory ceilings are basically industry's own suggestion, steel mills are being asked to watch for and report out-of-line orders. Military and defense procurement officials are being asked to do the same.

Manganese Boosts Steel Cost

Steel ingot production will cost about 32¢ more per ton, government price-setters say, as a result of substantial price increases allowed last week to producers of ferromanganese, manganese metal, and other manganese metallurgical items.

Ceiling Price Regulation 163, effective Aug. 8, permits new ceilings on manganese derivatives that will average about $40 per gross ton higher than previous ceilings. Effect of this increase on finished steel will be a rise in costs of about 46¢ per ton, according to Office of Price Stabilization.

Renegotiation Exemptions

U. S. Renegotiation Board has added 17 raw materials used in defense products to the list of those exempted from renegotiation. They are:

Natural tar, liquated antimony, metallic cadmium, natural and portland cement, sodium (produced directly by electrolysis of salt brine), unrefined copper anodes, germanium chloride and germanium oxide, iron pyrites (ores and concentrates), lime (including quicklime), metallic manganese, film mica, rare earth minerals, dimension stone, lump talc, metallic titanium, metallic zirconium, and nickel metal powder.

Other raw materials are being considered for possible exemption from government renegotiation, the board discloses.

NPA Okays Construction Quotas

National Production Authority last week gave the go-ahead signal to third and fourth quarter allocations for controlled materials for construction of 162 commercial and other projects with an estimated cost of more than $121 million.

This does not guarantee delivery of any materials, especially steel, during the remainder of the year. Chances are slim, especially if work has not yet started, since no deliveries will be allowed until after requirements of industrial expansion are met.

But it does allow the project builders to get their orders on the books. NPA has made provision for extending the validity of such fourth quarter allocations through February.

Latest Government Appointments

Harry C. Bates, labor member, WSB;

William C. Birthwright, labor member, WSB;

John Brophy, labor member, WSB;

Joseph Childs, labor member, WSB;

Thomas F. Coman, public member, WSB;

Archibald Cox, director and public member, WSB;

Malcolm Deniese, industrial member, WSB;

Harold L. Earson, public member, WSB;

Edwin C. Garwood, assistant deputy administrator for production, DPA;

Hiram S. Hall, industrial member, WSB;

Hoey A. Hennessy, industrial member, WSB;

Everett C. Roys, director, Communications Div., NPA., Dept. of Commerce;

Ben C. Sigal, labor member, WSB;

Millard E. Stone, industrial member, WSB;

Elmer E. Walker, labor member, WSB;

Paul J. Wedel, member, Renegotiation Board.

Alternate Pricing Methods

Proposed substitute methods for figuring Capehart-type ceiling price adjustments, if submitted by manufacturers of machinery and related items, will be considered by Office of Price Stabilization.

OPS has become aware that standing regulations hamper some manufacturers who have for many years used specialized accounting practices based on cost studies in computing selling prices. Supplementary Reg. 4, Ceiling Price Reg. 30, requiring the following of specific methods of cost allocation, forces these manufacturers to depart from their usual accounting practices, with resulting distortion in ceiling prices.

Amend. 3 to SR 4 allows manufacturers to propose substitute methods of calculating adjustment factors, with the provision that ceilings determined must be "substantially in line" with those figured under basic SR 4 terms.

Industry Controls This Week

Aluminum, Copper—Amend. 3, Rev. CMP Reg. 3 governs use of aluminum in construction. Amend. 1, M-47A restricts use of copper and aluminum in certain consumer durable goods and related products. Amend. 1, M-16 more clearly defines brass mill products and also concerns scrap dealers' monthly reports. Amend. 23, GOR 9 extends price control exemptions to cover some copper refined from imported raw materials.

Coke, Coal — Amend. 10, SR 13, GCPR exempts certain successor long-term contracts from price controls.

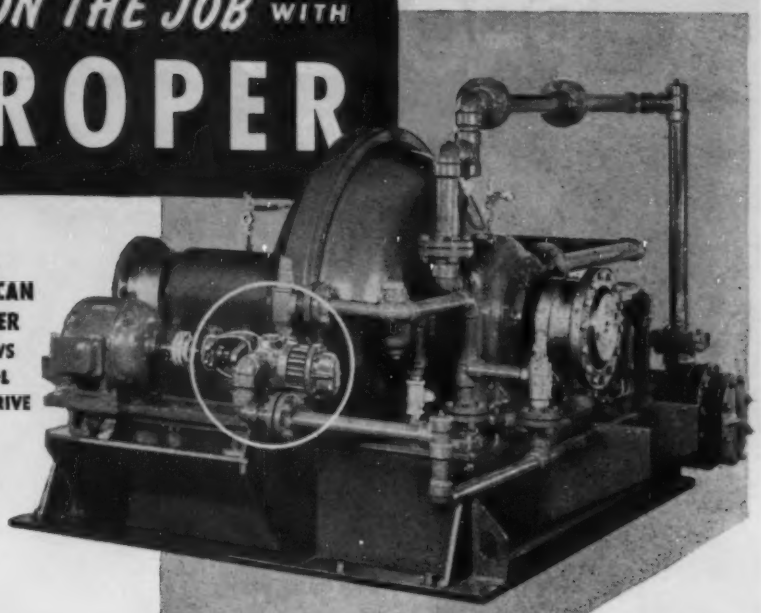
Construction—Amend. 2, M-100 regulates use of controlled materials in construction.

Manganese — CPR 163 increases price ceilings on ferromanganese, manganese metal and other manganese metallurgical products.

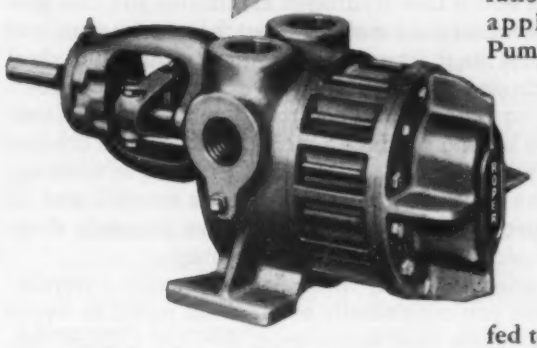
Fuel—Amend. 1, M-46 advances the filing date for Form PAD-26LP by 1 month.

Steel—Amend. 1 and Dir. 6, M-1 require producers of iron and steel products to reserve certain percentages of their production for military, atomic energy, machine tool and military component orders and also changes lead time.

ON THE JOB WITH ROPER



ANOTHER EXAMPLE SHOWING ROPER PUMPS AS INTEGRAL PARTS OF MODERN MECHANISMS



Gyrol Fluid Drives — for supply pumps, compressors, draft fans, and other industrial applications — use Roper Pumps to govern speed variation. In this model, the oil is taken from the oil reservoir and is added to the Fluid Drive working circuit to increase speed, or oil is removed from the circuit to decrease speed. The lubricating oil is constantly fed to all bearings. The Fluid Drive unit shown is a size 27 Type VS with maximum ratings of 518 HP at 1400 RPM.

SERIES F PUMP

Roper Series F Pumps — the models used as original equipment on Gyrol Fluid Drives — are recommended for pressures up to 300 PSI and come in 1 — 300 GPM sizes. They feature 4-port design offering eight optional piping arrangements (4 for CW and 4 for CCW rotations) . . . a factor which cuts installation time and costs. Equal size gears run in axial hydraulic balance; pumps furnished in standard or stainless steel fitted models; available with or without relief valve — with mechanical seal or packed box. Investigate what Roper Rotary Pumps can do for you!

SEE OUR CATALOG IN SWEET'S

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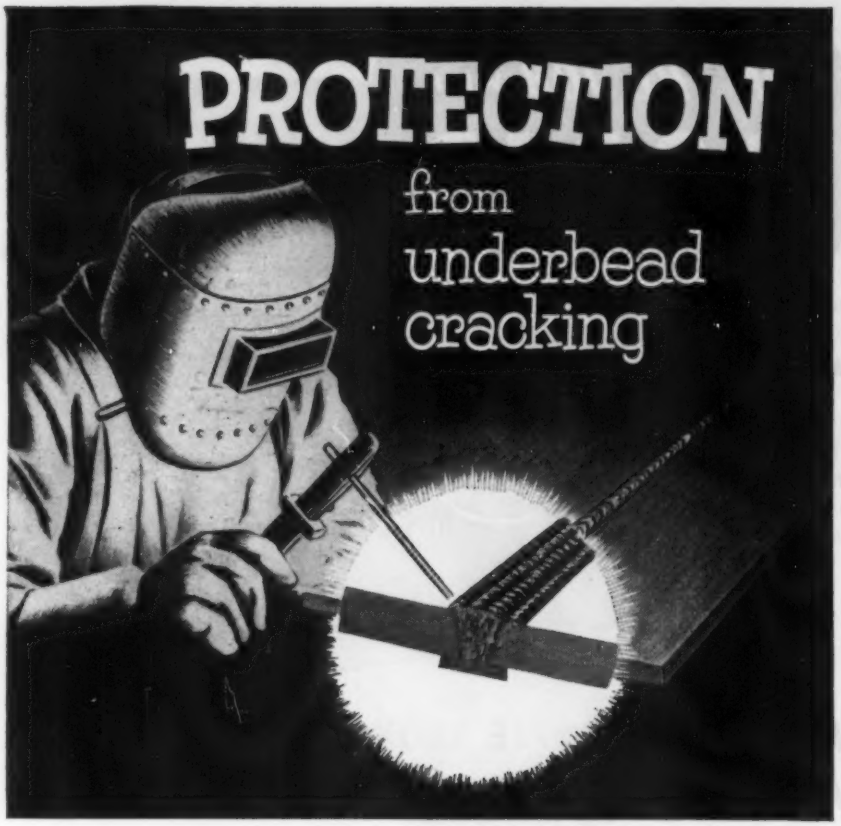
ROPER Rotary Pumps



Use ARCOS Low Hydrogen Electrodes

ARCOS GRADE	A.W.S. SPEC.
Tensilend 70	E7016
Tensilend 100	E10016
Tensilend 120	E12015
Manganend 1M	E9016
Manganend 2M	E10016
Nickend 2	E8015
Chromend 1M	E8015
Chromend 2M	E9015

With Arcos Low Hydrogen Electrodes you can produce sound weld metal without the need for preheat or post heat frequently required with mild steel electrodes. Correct selection and blending of coating ingredients, and controlled-cycle, high temperature baking produce a moisture-controlled coating that safely minimizes the gases released in welding.

The moisture-proof wrapping on every 5 and 10 lb. package in a box of electrodes prevents moisture pick-up in shipment and storage.

Added together, these Arcos "quality controls" assure you consistently sound weld metal on every high tensile steel application. ARCOS CORPORATION · 1500 South 50th St., Philadelphia 43, Pa.

WELD WITH

ARCOS

Specialists in Stainless, Low Hydrogen and Non-Ferrous Electrodes

—Marketing—

FOREIGN STEEL:

Importers wipe some of the cobwebs off order books as buying improves.

Before the steel strike, the importer of foreign steel had cobwebs on his order book. Average order was from 100 to 200 metric tons per customer. From a low point orders began climbing in size and frequency. And threat of a steel shortage is now putting orders of 1000 tons or better on the books. But a truly heavy volume of business has not materialized.

Importers are expecting another 90 days of better business from manufacturers seeking to assure themselves a supply of steel. Farm equipment, shipbuilding and repair, heavy construction equipment, heavy gas storage reservoirs industries have been consuming a good part of incoming shipments.

Some oil producers have taken their share of imports and a surprising amount of concrete reinforcing bars has been sold. At least one 1000-ton order of structural angles went to a Midwestern warehouse.

Japanese Casing — Interest is being shown in plate ranging from 3/16 to 2 in. in thickness. Two Japanese mills will deliver about 100,000 tons of plate to East and Gulf coast ports in the next 2 months. Bulk of this will be in ¼ to 1.5 in. plate, one importer claims.

American buyers for the most part remain cautious. They are not making long term buying arrangements. Much of present buying is slanted to covering direct need and it could vacate the market on short notice. Reasons for a quick bolting from the market remain the same: unreliability of foreign steel specifications and high price.

Ship plate, f.o.b. Antwerp, 60-day delivery, was quoted at $180 per ton last week. Some structural types were quoted at $105 per metric ton (2204 lb), a mild steel plate at $130 per ton. Add to this brokerage and shipping costs. (THE IRON AGE, July 3, 1952, p. 75.)

ELECTRONICS:

Low cost brain developed to handle engineering research computations.

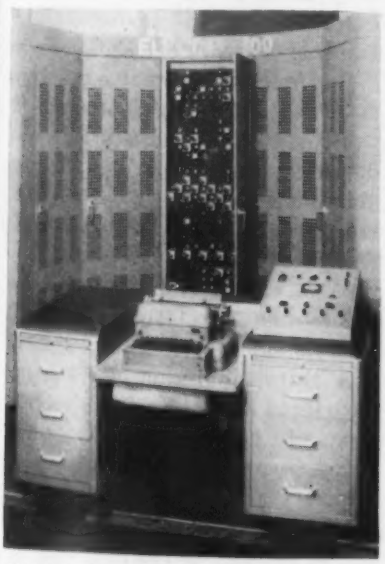
Cost of electronic brains, one of the handicaps to more widespread use, was struck a glancing blow by the recent development of a comparatively inexpensive ($62,500) electronic computer.

This most recent addition to the electronic brain family (THE IRON AGE, July 10, 1952, p. 92), called the Elecom 100, has a controlled memory capacity of 102,400 nine-digit words and can solve a ten-digit mathematical problem in 3 milliseconds. Designed and produced by Electron Computer Corp., New York, the unit is best adapted for engineering research computations.

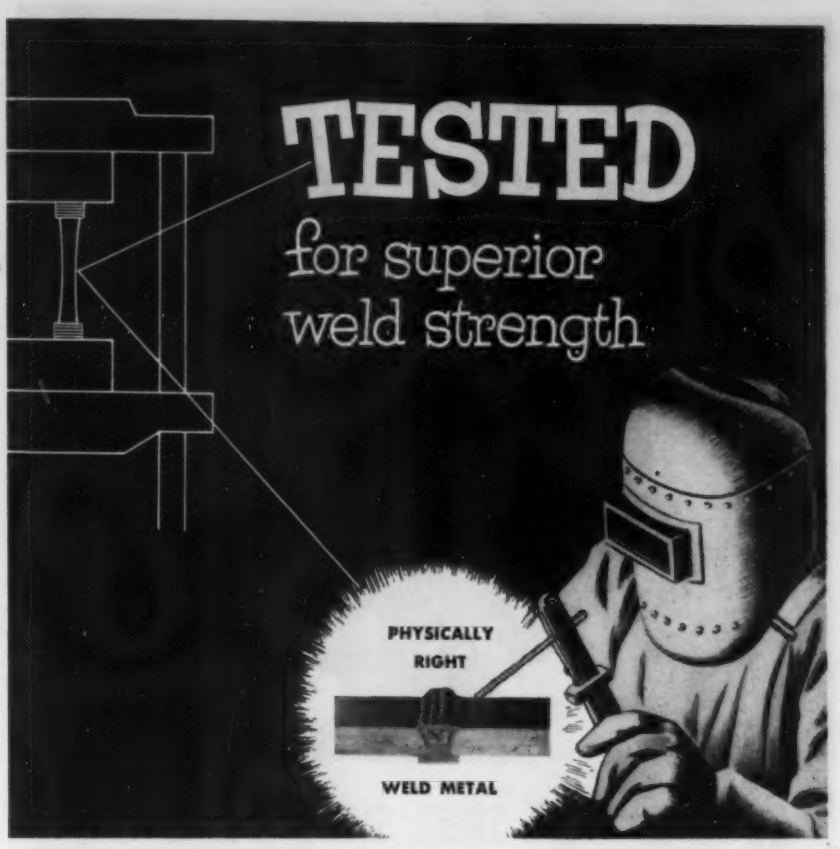
Business Model—Another unit, a business model (for payrolls, accounting, etc.) built along similar lines, is planned for early next year, the company told THE IRON AGE.

First installation of the Elecom 100 will be at the Ballistics Research Laboratory, Aberdeen, Md. It will be used to compute firing tables and test performance of rockets, ram-jets, guided missiles and secret atomic weapons.

Production of the "brains" is



BRAIN CHILD: Elecom 100, the first low-cost electronic digital computer to hit the market will be produced on assembly line basis.



Use ARCOS Stainless Electrodes

Because Arcos applies a series of mechanical performance tests for strength, toughness, and ductility to all types of Stainless weld metal, you can be sure that your deposits with Arcos Stainless Electrodes will be physically "right". Whatever the job requirement—ability to withstand heavy loads, high pressures, or severe shocks—you'll get the results you want.

Other Arcos "quality controls" assure that the weld metal will be chemically and metallurgically "right" as well. That's why it will pay you to depend on Arcos Stainless Electrodes for the correct combination of properties that lead to sound welds on every job. ARCOS CORPORATION • 1500 South 50th St., Philadelphia 43, Penna.

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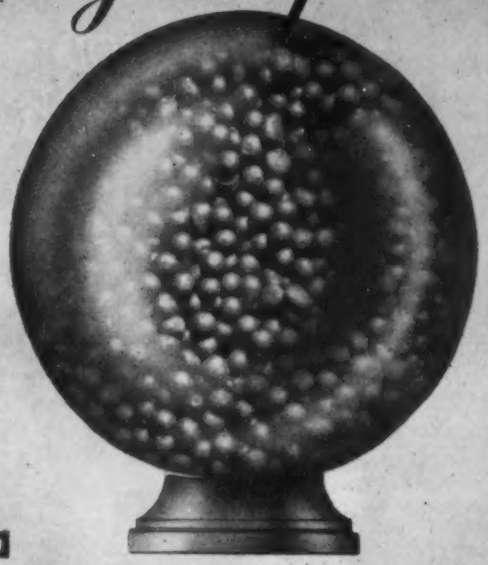
TRU-STEEL SHOT and *your future*



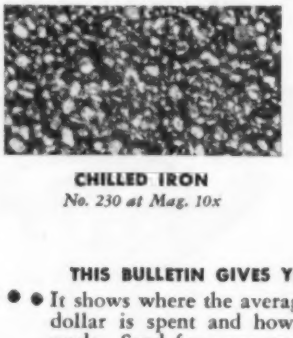
what a PERFECTED TRUE STEEL SHOT means to you

Like everyone else you are interested in lowering cleaning room costs and Tru-Steel Shot has a place in your future. That's because Tru-Steel Shot is setting new records for longer life and lower blast cleaning costs. It is reducing handling costs and maintenance time. WHY? Because Tru-Steel NEVER SHATTERS.

Industry has long been searching for an abrasive that won't shatter because doing so ends its effective cleaning life. Annealing and drawing have been tried with some degree of success. But only a true steel shot never shatters. TRU-STEEL has the toughness that only steel can give. Then to make it even more durable, Tru-Steel is *fully heat treated,* not just drawn and annealed. As a result, Tru-Steel lasts longer, cleans faster . . . costs less in the long run.

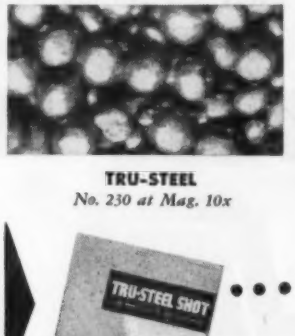
There are big savings ahead for you when you use Tru-Steel Shot.

LIFE COMPARISON -TRU-STEEL vs. CHILLED IRON SHOT



CHILLED IRON
No. 230 at Mag. 10x

after 1500 passes



TRU-STEEL
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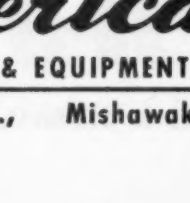
THIS BULLETIN GIVES YOU THE FACTS
It shows where the average blast cleaning dollar is spent and how savings can be made. Send for your copy today.



TRU-STEEL SHOT — American
WHEELABRATOR & EQUIPMENT CORP.
510 S. Byrkit St., Mishawaka, Ind.

scheduled at a rate of one a month. Electron Computer Corp. expects Elecom 100 will be used in the type of work required in aerodynamic research, stress analysis of high-strength alloys, composition studies of gases and liquids.

Order for a larger, more comprehensive Elecom unit has already been placed by a national magazine to keep records of more than a million subscribers, handle renewals, billings and mailings at a fraction of present costs. A similar model has been requested for use in the Pentagon to solve logistical problems. Cost of the larger models is $200,000.

The regular Elecom 100 consists of an office desk for the operator, a metal "memory" drum, and five computer cabinets.

U.S. Leads Powder Metal Research

Since World War II, the U. S. has captured leadership in powder metallurgical research from Europe, reports Dr. Henry H. Hausner, manager of Sylvania Electric Products Inc.'s Atomic Energy Div.

Previously America's dominance in powder metallurgy extended only to production. Now, however, this country is spending more money on research than has ever been spent in this field before. Europe, lacking funds, has had to drop much of its research and is concentrating on production, Dr. Hausner stated.

Reporting on powder metallurgy developments abroad, he stressed work in Switzerland that has produced a new type of sintered aluminum which shows great strength at high temperatures. And in Germany a new process has been developed to make continuous sheets and strips from metal powders he said.

A third significant development mentioned by Dr. Hausner is a new type of heating element introduced in Austria that may revolutionize the design of electric furnaces. The heating elements consist of silicon-covered molybdenum. With high mechanical strength they can be heated up to temperatures of 3100°F in air.

Defense Contracts

STEEL:

Defense program to feel impact of strike for coming 6 to 12 months.

Some phases of the defense program will feel the impact of the steel strike for 3 to 6 months. Steel losses will not be worked out of the arms program completely for 12 months. Some types of civilian production will take a beating.

This is the gist of a private report to the White House by Acting Defense Mobilizer John R. Steelman on the current status of the defense program.

Delays were not likely to be encountered in production of newly developed aircraft, Dr. Steelman said. Nor did it seem likely that the strike would have much effect on the machine tool program—because of lead time.

About 300 plants currently engaged on defense contracts, including ammunition, had either been forced to slow production or close down completely, he pointed out.

Next Year — Ammunition production would not be back on schedule before early 1953, for example, while delivery schedules for motor vehicles, particularly 2½-ton trucks, will not be straightened out much before next June. In addition, Navy's shipbuilding program has been set back considerably by having to delay starts until newly produced steel is available.

June shipments of machine tools were listed in the Steelman report as totaling $99.5 million for June. This was 25 pct above January levels and three times that of June 1950. Backlogs have been whittled down from 23.5 months in September 1951 to a current level of 12.6 months.

Renegotiation Leaflet Available

Steps in renegotiation and highlights of the process are covered for the defense contractor in a new leaflet, *The Facts of Renegotiation: What Is It, How It Works.*

Renegotiation Board policies affecting contractors are described in some detail. The leaflet also

The cost of close tolerance finishing can vary almost as much as the weather. Through development of wet blasting, large savings have been made possible in finishing costs . . . and now Liquamatte makes wet blasting EVEN MORE practical, economical and convenient. The Liquamatte has 14 advanced design features that overcome the many operating difficulties usually found in wet blasting. Thus it reduces finishing costs to the very minimum. With the Liquamatte, "hand" finishes are produced mechanically in a matter of seconds, eliminating many tedious operations. Precision parts can be processed while holding tolerances of .0001". Scale and directional grinding lines are uniformly removed, greatly prolonging the life of expensive tools and dies.

Liquamatte's 14 advanced design features mean 14-way savings for you. Send for Bulletin 23 and see.

Typical heat treated forging die, one half of which has been cleaned with the Liquamatte using a fine mesh Liquabrasive.

SEND TODAY FOR BULLETIN 23

It shows how Liquamatte's simplified design has reduced precision finishing costs to a new low.

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WHEELABRATOR & EQUIPMENT CORP.

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Industry's most Complete Line
UNIVERSAL BRONZE
JOHNSON SLEEVE BEARINGS AND BEARING METALS
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ALL these types of bearings and both Johnson Universal Bronze and Johnson Quality Babbitt are available from stock at your local Johnson Distributor's. In fact, he is able to furnish practically all your sleeve bearing needs from his stock. There are over 400 sizes of Universal Bronze in cored and solid bars. The range of sizes in Johnson Cast Bronze GP (General Purpose) Sleeve Bearings has been increased to over 900 sizes. For special applications, Johnson Bronze will design and manufacture sleeve bearings to your requirements.
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Sleeve Bearing Headquarters Since 1901
JOHNSON BEARINGS
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Defense Contracts

cites basic principles to be observed in any consideration of renegotiation.

Copies of the publication are available from the Renegotiation Board Information Office, Washington 25, or from the regional boards.

Contractors Volunteer Refunds

Reports from approximately 20,000 defense contractors and subcontractors are awaiting the attention of the Renegotiation Board, which reports that businessmen have made voluntary refunds to the board of $15,779,000 from profits earned since July 1, 1950.

Made in advance of actual determination by the government that profits were "excessive", refunds were based on the companies' own estimates of what constiuted fair and reasonable returns. The board must decide what the proper amounts involved should be.

Agency officials expect "several thousand" additional reports to reach their hands before fall.

Contracts Reported Last Week

Including description, quantity, dollar values, contractor and address. Italics indicate small business representatives.

Casing, burster, M13, 130000 ea, $165,910, Super Vent Co., Chicago.

Periscope T37, 5185 ea, $2,354,010, Bell & Howell Co., Chicago.

Cartridge, storage, case, M19A1, 190,000, $755,607, New Monarch Machine & Stamping, Des Moines, Ia.

Spare parts for gunners control, 144 ea, $871,890, Minneapolis-Honeywell Regulator Co., Minneapolis, *S. F. Keating.*

Auto spare parts, 51600 ea, $81,671, Wisconsin Motor Corp., Milwaukee.

Fuze, PD, M48A3, 7600 ea, $1,573,200, National Pressure Cooker Co., Eau Claire, Wis.

Launcher, rocket, 1660 ea, Birtman Electric Co., Rock Island, Ill.

Arm, indicator assy, $161,264.16, Birtman Electric Co., Rock Island, Ill.

Barrel, front assy, 10000 ea, Birtman Electric Co., Rock Island, Ill.

Mechanism, barrel recoil assy, 4705 ea, $30,637.75, Cherry-Burrell Corp., Cedar Rapids, Ia.

Var itms of gages, 251 ea, $123,915.71, Kennedy Tool & Gage Co., Farmington, Mich.

Exerciser, recoil mechanism, M1, 10 ea, Gram & Westergaard, Inc., Chicago.

Phase inverters, 630 ea, $244,642, Jack & Heintz, Inc., Cleveland.

Combined common-battery dial, 3600 ea, $416,857, Western Electric Co., New York.

Spare parts, Fairchild, var ea, $33,243, Fairchild Camera & Instrument Corp., Jamaica, L. I., N. Y.

Telephone equipt, 102 ea, $2,953,324, North Electric Co., Galion, Ohio.

Inverters, 1035 ea, $448,063, Leland Electric Co., Dayton.

Indicator oil pressure, 1882 ea, $92,820, Bendix Aviation Corp., Teterboro, N. J.

Special engine tools, 50000 ea, $1,805,000, Curtiss Wright Corp., Wood-Ridge, N. J.

Parts for hydraulic valves, $32,481, The New York Air Brake Co., New York.
Wheel assys, 727 ea, $1,014,429, The B. F. Goodrich Co., Dayton.
Indicators, ID-250, 7516 ea, Bendix Aviation Corp., Teterboro, N. J.
Indicators, ID-251, 1445 ea, Bendix Aviation Corp., Teterboro, N. J.
Indicators, ID-249A, 3099 ea, Bendix Aviation Corp., Teterboro, N. J.
Generators, 518 ea, $201,491, Bendix Aviation Corp., Teterboro, N. J.
Wire marking machines, 706 ea, $295,581, Ackerman-Gould Co., New York.
Wheel assy, 537 ea, $162,739, The Goodyear Tire & Rubber Co., Inc., Akron.
Repair parts for pumps, 2188 ea, $36,519, Worthington Corp., Harrison, N. J.
Repair parts for electric motors, 13529, $241,616, Westinghouse Electric Corp., Philadelphia.
Repair parts for diesel engines, 15440, $94,548, American Locomotive Co., Schenectady, N. Y.
Repair parts for main propulsion & auxiliary turbines, 4759 ea, $240,704, General Electric Co., Philadelphia.
Electric motors, 12490, $244,632, General Electric Co., Philadelphia.
Range, 6000 ea, $1,157,040, Cloric Stove Corp., Topton, Pa.
Range, 5000 ea, $964,200, Caloric Stove Corp., Topton, Pa.
Lockers, 21300 ea, $553,800, Rockaway Metal Products Corp., Far Rockaway, N. Y.
Refrigerators, 450 ea, $51,394.50, Frigidaire Sales Corp., Los Angeles.
Repair parts, 138 line itm, $27,692, Chicago Pneumatic Tool Co., Los Angeles.
Range Field, 912 ea, $62,891, Presto Gas Mfg. Co., Chicago.
Range Field, 3660 ea, $269,705, Wm. R. Boots Mfg. Co., Inc., Evansville, Ind.
Range Field, 3918 ea, $288,717, Wm. R. Boots Mfg. Co., Inc., Evansville, Ind.
Range Field, 900 ea, $62,064, Presto Gas Mfg. Co., Chicago.

Government Inviting Bids

Latest proposed Federal procurements, listed by item, quantity, invitation No. or proposal and opening date. (Invitations for Bid numbers are followed by "B," requests for proposals or quotations by "Q.")

Chemical Procurement District, Chicago.
Fuse, bomb, 2142890, CML 11-021-53-8, Sept. 15.
Cone, 26840, CML 11-021-53-7, Sept. 13.
Fin assy, 26840, CML 11-021-53-7, Sept. 13.
Fin, packing crate, steel, 26840, CML 11-021-53-7, Sept. 13.
Casing assy, CML 11-021-53-6, Sept. 12.
Nose assy, 27476, CML 11-021-53-6, Sept. 12.
Bar assy, 137379, CML 11-021-53-6, Sept. 12.
Front end assy, 27476, CML 11-021-53-6, Sept. 12.

Ordnance Tank Automotive Center, Detroit.
Shim fuel tank, 100, 53-32-B, Aug. 29.

Griffiss Air Force Base, Rome, N. Y.
Fixture, fluorescent, 93 ea, IFB 30-602-53-5, Aug. 20.
Fixture, fluorescent, 166 ea, IFB 30-602-53-5, Aug. 20.

General Stores Supply Office, Philadelphia.
Horn assy, 7000 ea, 3-1120B, Aug. 20.

General Services Administration, New York.
Hand tools, 2363 ea, NY-3K-39872, Aug. 18.

General Services Administration, Los Angeles.
Fixtures, lighting, fluorescent, 200 ea, LA-83-53, Aug. 13.

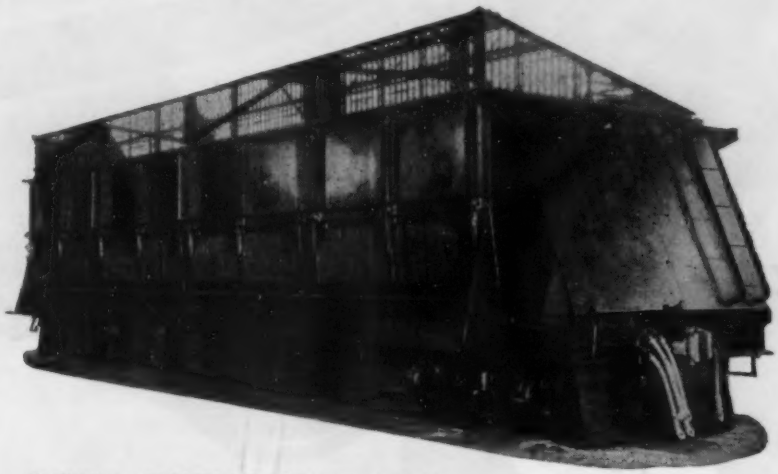
General Services Administration, Washington.
Chairs, office steel, 450 ea, IY-16859-R, Aug. 21.
Chairs, office, aluminum, 139 ea, IY-16859-R, Aug. 21.
Cabinet, Indef, IT-363, Aug. 22.
Desks, telephone and typewriter stands and tables, steel, Indef, IT-362, Aug. 21.
Upright file sections, steel, Indef, IT-361, Aug. 20.
Sign plates, 1799 ea, 3D-16806-R, Aug. 18.

Civil Aeronautics Administration, Fort Worth.
Relay mechanical, 500 ea, 4-53-10, Aug. 18.

50 Years of KNOW-HOW

ATLAS CARS

For more than 50 years Atlas has been designing coke oven machinery of acknowledged excellence. Coal Charging Cars, Coke Quenching Cars, Door Extractors and Coke Guides *must* be built with "know-how" to produce best operating results and lowest maintenance. Let Atlas quote on your needs.



COKE QUENCHING CAR

The latest Atlas Quenching Cars have longer life with lower maintenance than previous types. Their cost also is lower. This is due to the welded "corrosion-resisting" frame of heavier material with fewer joints and all joints weld-sealed together with the use of abrasion resisting floor plates, which outwear cast plates and cost much less to replace. There is no welding on Atlas abrasion resisting floor plates The improved door operating mechanism is sealed against the entrance of coke dust and water and is simplified to eliminate the troublesome line shafts. Coke deflectors are provided at each end. Air hoses are armorclad. Gates generally are of steel bars arranged for easy replacement. Cars are supplied with or without upper coke racks.

Custom Builders of Coke Oven Equipment

THE ATLAS CAR & MFG. CO.
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protection for industrial workers

keeps you on the safe side

WILLSON SAFETY EQUIPMENT

Like these sturdy welding goggles, all Willson safety equipment is made after careful study of industry's needs. Through this continuing research you get many comfort and safety improvements first in Willson products. Ask for Willson—largest line of goggles and helmets for gas and arc welding.

COVER-ALL® GOGGLE
No. CW60

Adjustable leather nose bridge for extra comfort. Ample room for prescription glasses.

CHIP-WELD GOGGLE
No. DC53

Weld lens lifts up to leave clear Super-Tough® lens in place for chipping and inspection.

FLIP-FRONT HELMET
No. 60S

One-piece durable fibre shell with lift-up outer lens for quick inspection of work.

See your WILLSON distributor or write for bulletin
WILLSON PRODUCTS, Inc., 231 Washington St., Reading, Pennsylvania

—Management—

Technological Council Founded

As an adjunct of Machinery and Allied Products Institute, a new organization has been formed to speed industrial development. Main objective of the new group, The Council for Technological Advancement, is to inject new vigor in our economy by improving industrial operations.

Specific projects of the organization have not as yet been definitely determined but are expected to include a study of improved marketing techniques for industrial equipment, both domestic and foreign, and the exchange and promotion of engineering ideas on plant modernization, alternative production methods, plant construction and location.

CTA also hopes to make an analysis of methods designed to eliminate the current cyclical demand for capital goods. Another prospective project is measurement of the effects of changing dollar value on industry equipment depreciation and replacement policies. An information program on technological trends and new techniques, products and industries is also scheduled.

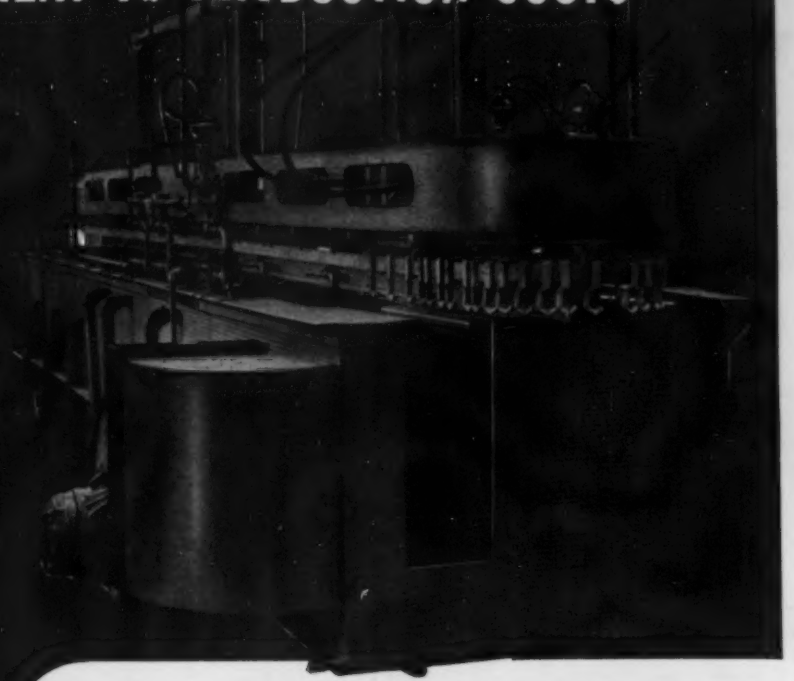
Headquarters of The Council for Technological Advancement will be in the Chicago offices of MAPI. Heading the organization is Alexander Konkle, of MAPI, vice-president.

Machine Shop Training School

Free 2-year training courses in mechanical technology are scheduled to start in September in the new $2.5 million machine shop at the Long Island Agricultural and Technical Institute, Farmingdale, N. Y. Reported to be the largest single building in the U. S. for technical training, the shop will be equipped with almost 500 pieces of major machine shop and laboratory equipment.

Open to graduates of New York State high schools, the courses will include training in automotive and diesel work, metalworking, refrigerating, heating and air conditioning, electrical equipment and building construction.

TORRINGTON FINDS *Udylite* MACHINE IS A TRIPLE-THREAT TO PRODUCTION COSTS



1

THREE PEOPLE DO WORK FORMERLY DONE BY EIGHT

2

MORE UNIFORM PLATING WITH REDUCED HANDLING

3

IMPROVED WORKING CONDITIONS FOR EMPLOYEES

● Here's graphic proof that Udylite can show you the way to better plating at lower cost. The Torrington Manufacturing Co., Torrington, Conn., has realized all these benefits with a Udylite Full Automatic Plating Machine in their Air Impeller Division plant. The machine is used in processing blower wheels for use in cooling military electronic equipment.

There are countless other ways that Udylite Plating machines pay their way, in addition to the ones above. For example, their compactness requires less floor space; their rugged construction and clean design result in negligible maintenance costs. They are extremely versatile and it is a simple matter to modify them for virtually any metal finishing process. Your Udylite Technical Man can give you dozens of instances where Udylite Machines are paying for themselves with increased production and lowered overhead. Call him today or write direct for complete information.

THE *Udylite* CORPORATION
DETROIT 11, MICHIGAN

Industrial Briefs

New Plant—CARBIDE & CARBON CHEMICALS CO., a division of Union Carbide & Carbon Corp., has acquired a 140-acre tract at Torrance, Calif., where it plans to build a $36 million polythylene and ethylene glycol plant.

Option—UNION METAL MFG. CO., of Canton, Ohio, has taken an option on a 16-acre site at Brampton, Ont., where it plans the erection of a plant with initial floor space of 15,000 sq ft.

New Plant—PACIFIC AIRMOTIVE CORP. has opened a new plant at 1953 Ontario, Burbank, Calif.

New Name—The former Import-Export Trade Practice Committee of the National Assn. of Waste Material Dealers, Inc., has been reactivated under a new name—THE FOREIGN TRADE COMMITTEE.

Seminar—The 3rd annual seminar in industrial instrumentation will be held in MINNEAPOLIS-HONEYWELL REGULATOR CO.'S training school in Philadelphia for professors of engineering Aug. 18-22.

Awarded—Small Motor Div., WESTINGHOUSE ELECTRIC CORP., has been awarded a contract for $10,500,000 in aircraft generators.

Appointed—General Welding Equipt. Co., St. Louis, has been appointed distributor by HARNISCHFEGER CORP.

New Address—JOHNSON MACHINE WORKS moved recently to 437 Blvd., East Paterson, N. J.

Degree—NEW YORK UNIVERSITY will offer the degree of Master of Science in Metallurgy for the first time with the opening of regular academic year in September.

Purchases Interests—Rodman H. Martin recently purchased the interests of James A. Quaid in the Martin-Quaid Co., Philadelphia, and has changed the name to RODMAN H. MARTIN CO.

Export Activities—All export activities of the Automotive Replacement Products Div., of Bohn Aluminum & Brass Corp., Detroit, are to be handled by BORG-WARNER INTERNATIONAL CORP.

Being Erected—LURIA ENGINEERING CO. is erecting two new steel warehouses for the Monroe Scrap Material Co.

New Warehouse—RAYBESTOS-MANHATTAN, INC., has opened a new warehouse in Houston.

New Division—THE SCHAIBLE CO. has formed three sales divisions. They are: Plumbing and Heating Div., D. T. Williams Valve Div., and Disposer Div.

Break Ground—BATTELLE INSTITUTE, Columbus, Ohio, broke ground recently for a new million dollar "special purpose" laboratory building.

Ceramic Dept.—TOLEDO PORCELAIN ENAMEL PRODUCTS CO., Toledo, which recently became a wholly-owned subsidiary of Bettinger

CHECKUP: Irvin L. Clymer, president, U. S. Steel Michigan Limestone Div. (left) goes over blueprints with Armin L. Pitz, vice-president, Manitowoc Shipbuilding Co., aboard the limestone carrier *John G. Munson*. Ship is believed to be the largest self-unloader ever built for Great Lakes shipping.

Corp., Waltham, Mass., will develop ... complete high temperature ceram... department to coat high alloy meta... for airplane engine "hot" parts.

Now Available — LINATEX CORP... OF AMERICA, Rockville, Conn., ha... announced that Linatex is now avail... able in the U. S. Linatex is a specia... form of natural rubber made i... Malaya.

Earnings—JOY MFG. CO., reports ne... earnings for the 9 months which end... ed June 30 of $3,454,660.

Organized—A field group to provid... General Machinery Div. customer... throughout the country with a maxi... mum of fast and efficient service ha... been organized by ALLIS-CHALM... ERS MFG. CO., Milwaukee.

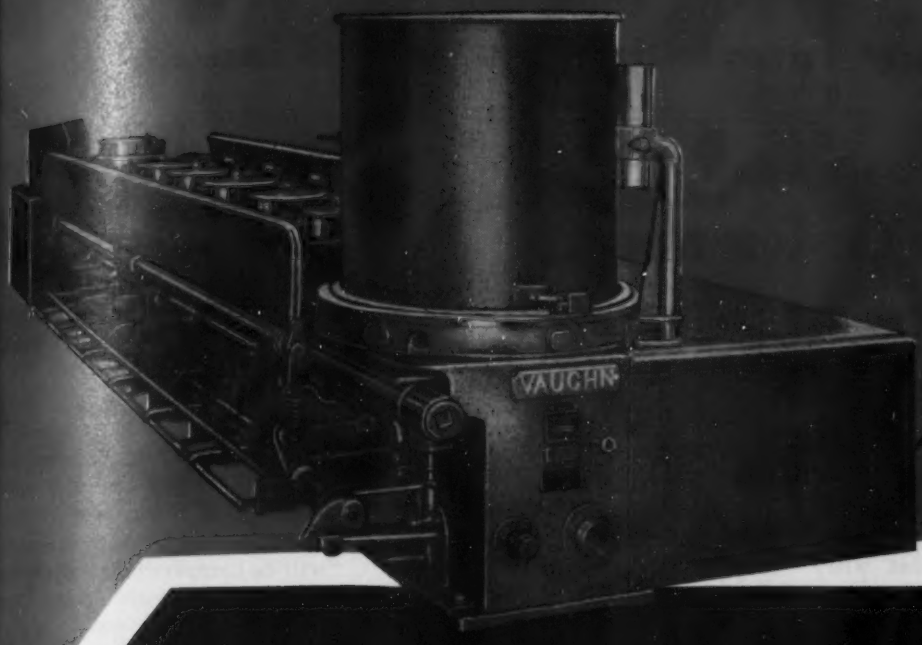
New Freighter — The new iron or... freighter being constructed for NA... TIONAL STEEL CORP., Pittsburgh... one of the largest vessels ever bui... on the Great Lakes, will be named th... *Ernest T. Weir*.

Pay Boost — Salaried employees o... BETHLEHEM STEEL CO. are to ge... pay boosts. Salaries and incentiv... rates of employees in the steel divi... sion earning $1,250 a month or les... would be increased 10 pct with ... minimum salary boost of $22 a month... The boost does not cover employees... in bargaining units for whom a... agreement has not yet been negoti... ated.

Planning — REICHHOLD CHEMI... CALS, INC., plans to manufacture... and market powdered phenolics for ... wide variety of industrial applications...

Identification—The name "ECLIPSE"... will be used to identify all gas and oil... fired industrial appliances manufac... tured by ECLIPSE FUEL ENGI... NEERING CO., Rockford, Ill., t... simplify product recognition.

Purchase — About 50 acres of lan... have been purchased by BODINE... ELECTRIC CO., Chicago. Company... plans to use part of the land for the... construction of additional factory and... office buildings.



Complete Guards for all Blocks . . .

an Electric Eye for Automatic Full Bundle Stop . . .

Now Available on all Latest Type

Vaughn® MOTOBLOX®

"Quick on the Draw!"

THE VAUGHN MACHINERY CO.

Cuyahoga Falls, Ohio, U.S.A.

COMPLETE COLD DRAWING EQUIPMENT . . . Continuous or Single Block . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.

Will Your New Car Cost More?

Guessing game starts on effect of steel increase on auto prices . . . No boost expected for '52 models . . . Steel strike, crop losses have weakened demand—By *R. D. Raddant.*

Eyes of all automobile producers and potential customers as well have turned to prices. The guessing game began as to what effect the new steel prices will have on delivered prices of new cars.

Best guesses were that they would have no immediate effect on 1952 models for the remainder of production runs this year. It was generally believed that the impact would not reach the customer until 1953 cars make their appearance in showrooms.

Reasoning behind these conclusions is this: In spite of increased costs, manufacturers consider it inadvisable to increase prices when their primary concern is completing and selling out the last of this year's cars.

Demand Drops—Even with the loss of production, deflationary effect of the strike coupled with bad crops in agricultural areas combined to take a great deal of demand out of the market.

An exception immediately appeared when Kaiser - Frazer boosted the Henry J price an amount that will total almost $60 at the retail level. However, this price boost was not prompted by threatening steel cost increases but by the extremely high cost of conversion steel that kept production uninterrupted during the strike.

Henry J prices were cut Apr. 21 an average of $160 in a competitive price cut. Increase, therefore, was still within the price ceiling. It was believed to be temporary and the price should revert to the former level, or nearly so, when normal steel sources of supply can be resumed.

Starting Up—A paid advertisement in Detroit newspapers last week told the story as automotive plants tried to get back on their feet after the disastrous steel strike.

The ad, by Dodge Div. of Chrysler, warned all employees: "Be on the alert. If steel begins to flow again as we hope, Dodge will be able to resume operations soon."

Then followed a list of plants and the rough schedule on which employees might hope to be called back to work. First on the list were plants with basic functions — forge shops, foundries, and press plants. These received the first steel direct from mills and naturally went into production first.

This week, final assembly plants, paint, trim, transmission and engine assembly plants began calling back their employees. Truck plants, including military vehicles, were scheduled to start Aug. 11.

"Sure I get tired of manufacturing, but it's the only thing I know."

Subnormal—Some of the companies and divisions were in better shape, some worse. Automotive production was not expected to return to normal before the end of August.

Most Ford assembly plants opened on a 5-day week Aug. 4, but employees were advised that many plants and assembly operations would continue on reduced schedules and that production "will be hampered for an indefinite period." The truth of this statement was evident when some 30,000 employees were laid off again for the week of Aug. 11.

On the other hand, Nash plants that closed July 3 will not open until Aug. 18, the date also scheduled for the reopening of Studebaker. General Motors divisions had varied schedules for returns. At the middle of last week about 78,000 were still unemployed against a peak unemployment July 29 when 144,000 were idle.

More For Less—New technological improvements will bring out higher production rates at a shorter work week by 1960.

This conclusion was reached in a study of long range manufacturing trends compiled by the business research department of the B. F. Goodrich Co. in evaluating trends in the rubber, automotive, and allied industries.

Because of an expected rise in the total output of goods and services per worker, a 27 pct increase in goods was forecast against a 15 pct increase in population from 1950 to 1960.

According to the survey, this increased production per man will permit record output despite the prediction that the average working week will drop below 40 hr for the first time in our history.

It's Needed—The forecast was made that private industry will invest as much as $200 billion in new plants and equipment that will make all this possible. And

most of this should be necessary.

A shift in the age of our population by 1960 will mean that the number of mouths to feed will be 4½ times that of the increase in working manpower. This is caused by the curious quirk that the low birth rate of depression days is beginning to cut the labor force at the same time the postwar baby crop is demanding to be fed, clothed, educated, and cared for.

What all this means to B. F. Goodrich is boiled down to an increase of 14 million auto registrations in that period and a comparable increase in tire demand. Company cheerfully predicts, however, that in 1960 the average motorist will drive 25 pct more on tires that will last at least that much longer than the 1950 vintage.

MOVING:

Lincoln-Mercury moves from Detroit to modern, new plant in Wayne, Mich.

An historic moving operation began this week when Lincoln-Mercury began an exodus from its old plant in Detroit to the comparatively rural areas of Wayne, Mich.

The moving operation will mark the transition of Ford's quality car manufacture from one of the most antiquated plants in the automotive industry to the newest. Some of the operations at the new plant, still undisclosed, will undoubtedly set new standards in automation.

Part-and-parcel movement of the entire manufacturing plant from an established location shows the length and expense that industry will go to obtain the conditions modern manufacturing methods demand.

The moving operation itself, which will take more than 2 months and be accomplished without loss of production, will cost $1 million. The multi-million dollar plant has been under construction for amost 2 years.

Too Old—Movement was necessitated by the antiquated plant which hampered utilization of new methods. Its location in one of Detroit's most congested industrial areas prohibited expansion while high city taxes took a deep bite into profits.

No plans for utilization of the large plant facilities have been announced. It may stand idle until purchased for manufacturing or warehousing or it may be snapped up for defense production. It appears to be too valuable to stand idle, but too expensive to operate.

Lincoln Motor Co. was purchased in 1922 by the late Henry Ford and his son, Edsel. One story is that Mr. Ford wanted a more stylish car to ride in than his own Model T and bought the Lincoln Co. just so he could have one of his own making. A more probable reason was that his son felt that the company should also produce a quality product for competitive reasons.

The body shop will be the first to move and within 10 days will be ready to turn out completed bodies in white. These will be trucked to the old plant for final assembly until this operation is ready to be performed in the new plant.

Other departments will follow until the entire moving is completed in mid-October. New location is also a dual-purpose plant and manufacture of jet engine parts for aircraft will be carried on there.

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS	TOTAL
Aug. 9, 1952	33,946*	8,656*	42,602*
Aug. 2 1952	16,998	5,150	22,148
Aug. 11, 1951	75,226	22,126	97,352
Aug. 4, 1911	87,635	29,375	117,010

*Estimated

Source: *Ward's Reports*

THE BULL OF THE WOODS By J. R. Williams

ARE YOU GITTIN' FAINT, CHARLIE? WATCH-- WATCH THAT BOLT BOX!
CHARLIE'S GOT A LUNCH BOX TOMATO IN HIS HAND AND IS SQUEEZIN' IT WHILE HE STAGGERS TO TH' FIRST AID! HE SEZ TO WATCH WHO IT IS RUSHES TO HELP HIM!
OF COURSE THEY ARE ALL OLD-TIMERS WITH MEMORIES OF TH' PAST! WITH ALL TH' SAFETY DEVICES NOW, THE ONLY WAY YOU LOSE A FINGERNAIL IS BITIN' 'EM!
8-15
J.R.WILLIAMS
THE ALUMNI

with flamatic selective surface hardening

Mark your print to show where you want hardness — and where you don't want it — and chances are Flamatic will do the job right to specs, and economically as well. The etched section of a refrigerator unit crankshaft for Crosley Division, Avco Mfg. Corp. shows how Flamatic hardens the bearing surface, brings the pattern right up to the flange, yet prevents burning or cracking around the radial oil hole. Material: Class A pearlitic malleable iron. Surface hardness: Rc 45-55. Production asked: 1350 parts per 8-hour day. Production achieved: 1600 per 8-hour day. Distortion: well inside grinding limits.

Gears, cams, rollers, parts with multiple diameters, etc., up to 18" OD depending on width or shafts up to 24" long depending on OD are readily handled on the Standard Flamatic. Write for Catalog No. M-1724 which includes case histories. Send part prints for analysis and recommendations.

flamatic

THE CINCINNATI MILLING MACHINE CO.

Cincinnati 9, Ohio, U.S.A. • CINCINNATI

Shirk Freezing of Weapons Design

Freezing of plane and weapons design for unhampered production still in talking stage . . . Automakers want unrestricted right in conversion . . . AEC close-mouthed—By G. H. Baker.

Military production planners are beginning to find themselves hard-pressed for excuses as to why fixing of designs of military aircraft—as well as many other primary weapons of war—still has not budged from the talking stage at Pentagon conference tables.

The Korean war is now well into its third year, yet defense production officials continue to boggle at approving any war contracts that suggest "freezes" in the design of modern war implements.

Reasons For Flux—The "fast-changing character" of current warfare, plus the "fluidity of our strategy approaches" are given as reasons for refusing to concentrate on any long-range designs.

When all this double-talk is cleared away, however, it becomes clear that military purchasing officials actually live in the almost-constant fear of being called on the carpet to explain any procurement order that may even faintly suggest obsolescence.

Public Scolding—Too many procurement people recall vividly the political reprimands rapped out to them in public sessions on Capitol Hill. They naturally prefer the easier course of keeping all contracts open for improvements.

This has caused constant delays in production and a long chain of engineering headaches, plus increased costs. But there's a growing belief that the military soon will have to "light" somewhere—if production of some of the key weapons of war is ever going to be shifted into high gear.

How Many Autos?—By Oct. 1, the automobile industry may have a fairly clear idea of where it stands with regard to supplies of steel. As of this week, the real impact of the steel strike upon the industry still is being figured out by government allocation officials.

Detroit's first task is to refill its depleted inventories. Once the pipelines of supply begin to fill up, the industry and National Production Authority will begin to have some idea of what will happen to 1952 production goals.

Unlimited Conversion? — Washington officials claim automakers generally are in good shape on flat-rolled steel when it's compared to the bad situation on bars and plate. To get their steel supply out of the red, some producers want the green light on unrestricted conversion. Under the present system they are allowed to use conversion steel above CMP allotments as long as it does not exceed a certain percentage of historical use.

If it tops this limit then the tonnage will be deducted from their allocation. Automakers want the right to go into conversion without this penalty of CMP deduction. In other words, they want to use tonnages above their set limits. By doing his they feel they can catch up to their CMP schedules as early as December or January.

"But Senator . . . you promised."

Mystery Depends—The tendency to "clam up" in any discussion of nuclear fission programs reduces the new semi-annual report of the Atomic Energy Commission to a collection of vague generalities.

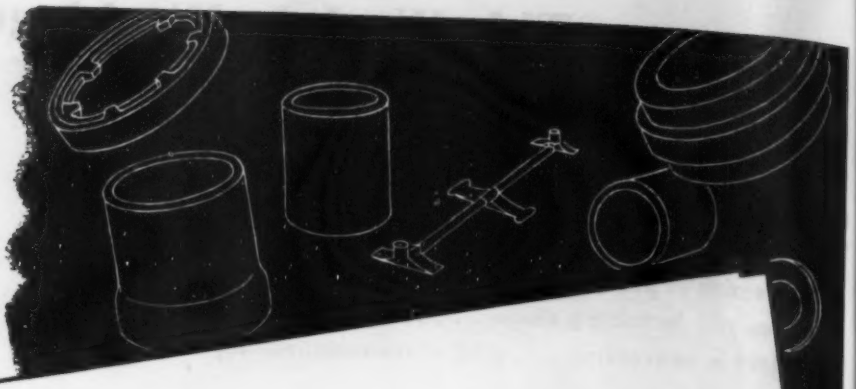
Weapons information is non-existent. Atomic energy in civilian industrial production is dismissed with the brief notice that AEC has set up an "Office of Industrial Development" to look into the matter.

Uranium Hunt—Procurement of its raw materials — principally uranium concentrates — is discussed in abbreviated form. What can be gleaned is that AEC has stepped up its search for new sources of the rare ore.

For example: New processing plants are now under construction and others are being enlarged in Colorado and New Mexico. Ore-buying stations are being set up in Utah and South Dakota.

No Takers—Although problems of working capital continue to plague many small defense contractors and subcontractors, new federal lending statistics show that there currently are no takers for a $600 million defense-loan kitty supervised by the Federal Reserve Board.

Under the government V-loan program, the nine principal procurement agencies in Washington are authorized to guarantee loans to defense contractors and subcontractors. The loans are then made by banks. V-loans now outstanding total about $883 million, of which nearly $704 million is government-guaranteed. About $615 million still is available to borrowers under guarantee agreements. But none of this amount has yet been called for by business firms.



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MINERALS: Start African Survey

U. S. prospectors begin aerial, ground mapping of Portuguese African colonies . . . Cost to be partly paid by MSA funds . . . Hope for uranium deposits—by *A. K. Rannells.*

September will see the start of aerial mapping in support of American ground prospectors in their search for mineral deposits in Portuguese East and West Africa.

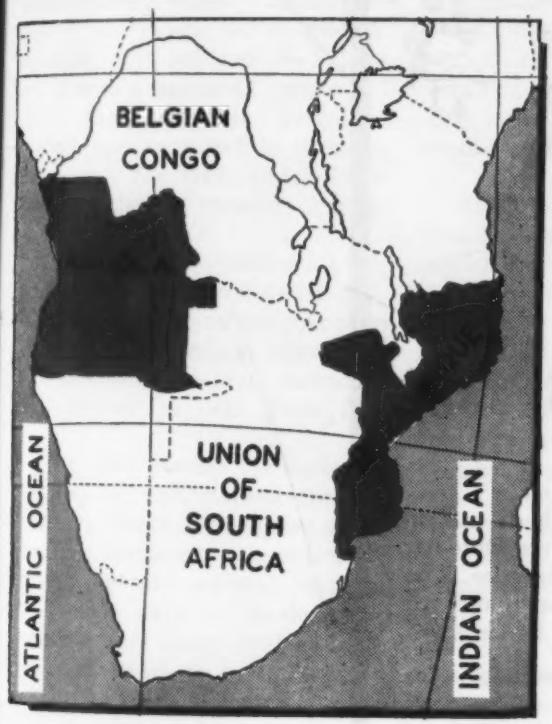
Cost of the overall minerals search will be approximately $2 million. The U. S. will foot the bill for $1.3 million through Mutual Security Administration funds.

Contracts have already been completed for the September start. E. J. Longyear Co., mining engineers, will do the geological and ground work while the Aero Service Corp. will conduct aerial mapping for the ground workers.

This is the most ambitious undertaking in carrying on the overseas search for metals and minerals under the Marshall Plan and Mutual Aid Pact.

Search will center in Angola (west coast) and Mozambique (east coast). Total area to be surveyed covers more than 62,000 sq mi.

While the primary purpose of the mapping and prospecting is listed as finding out which areas are best suited to further exploration and development of new sources of copper, cobalt, tin, lead and manganese, it is no secret that there are high hopes of finding uranium deposits.



SURVEY: U. S. prospectors are starting aerial and ground mapping of the Angola and Mozambique areas (in color) in hope of finding new deposits of critical minerals, including uranium.

Latter expectation is based on the fact that Angola flanks the Belgian Congo, one of the major Free World sources of high grade uranium ore.

In addition to picking up its share of the survey, Portugal has agreed to set aside the equivalent of $1.1 million in counterpart funds for carrying out the mutual defense pact.

Portugal has nothing to lose. Development of a flourishing mining industry in the two colonies would also bring in outside private capital, largely American, to strengthen the economy.

Originally, the survey by ground prospecting alone was estimated to require 10 years. By combining an aerial survey at the same time, it will require from 2-to-3 years.

About 26 American technicians and engineers are already overseas or on their way. They will be joined by others later.

Polonium 210 Being Sold by AEC

Reactor-produced radioactive polonium may now be purchased for research purposes at Oak Ridge National Laboratory, Oak Ridge, Tenn. Polonium is the first reactor-produced radioisotope to be sold which emits alpha particles. It can also be used as a source of high energy neutrons.

When bought for use as a neutron source, the polonium will be mixed with beryllium and enclosed in a nickel cylinder about ¾ in. in diam. As an alpha source, the polonium will be plated on platinum.

Polonium 210 produced in a reactor by neutron bombardment of bismuth is of higher purity than polonium derived from the radioactive decay of radium.

Atomic Energy Commission expects the polonium will be used by research groups for physical and biological investigations. It may also find use in oil well logging and for ionization sources. The element could also be employed in luminous phosphors, static elimination and other industrial purposes, but AEC reports supply is not as yet sufficient for these uses.

Commercial Plane Goal Revised

The government wants 600 commercial carrier aircraft delivered not later than Dec. 31, 1954, and is ready to issue tax certificates covering 386 of this total.

This expansion program was established by Defense Production Administration last week and the total includes aircraft already planned. Tax certificates have been issued for 214 planes valued at more than $171 million.

PYDRAUL KEEPS FIRE ENGINES AWAY

Three times in the last year, breaks in die-casting hydraulic systems have sprayed fluid over white-hot metal, yet there were no fires . . . no injuries . . . no deaths. These hydraulic systems employed Monsanto Pydraul F-9.

Pydraul F-9 is Monsanto's nonflammable-type hydraulic fluid, now used in some of America's best-known die-casting plants. Not only does Pydraul F-9 eliminate a cause of costly fires, but gives you a bonus of efficiency and economy because of its high lubricity and resistance to mechanical shear and chemical breakdown. Pydraul F-9 is noncorrosive to die-casting equipment.

You can change to Pydraul F-9 simply by draining and refilling your hydraulic system. Why not switch to the safety, efficiency and economy of Pydraul F-9? For complete details contact the nearest Monsanto Sales Office or write MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Missouri.

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Industry Gets Back In Business

All western steel mills back in operation except Northwest . . . Economy is new order . . . Fabricating division in full production . . . Await new OPS price order—*By T. M. Rohan.*

Western steel mills were back in the groove last week. The most worried workers were the price clerks whose mountain of paperwork snowballs as Office of Price Stabilization delays announcement of new prices. All shipments at present are being made at old prices with a notice of future revision. Most price men privately expect the new schedule to be a swan song for OPS Chief Ellis Arnall, resigning because of a 50 pct personnel cut.

Warehouses were taking all the steel they are allowed under National Production Authority order M6-A. Except in minor items like wire and spikes, defense agencies are expected to take their full quota.

Mills have become increasingly economy minded. Rolling time is held to a single shift where overtime was previously allowed. Conversion jobs are rejected because they would have to be done on overtime. And there isn't enough conversion work to justify a second shift. When possible, larger sizes are scheduled because fewer turns are needed, thus cutting rolling time.

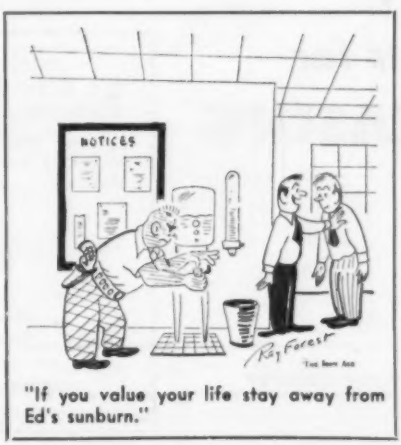
Producers are reaching a long way for scrap and $10-per-ton freight bills are not uncommon. Some shortage may develop later as dealer inventories diminish.

Fabrication Troubles—Fabricating divisions of steel companies are in full production, working with material either on hand before the strike or obtained since. Independent fabricators are having a tougher time of it but have been kept in business by mills which operated during the strike. Thus far there has been no scramble and no major plants have shut down for lack of steel.

All western producers are back in operation at near or over capacity levels except Northwestern Steel Rolling Mills at Seattle which at week's end was still dickering independently with its CIO union on eight crucial points—and watching the orders go by.

Rags to Riches—Ford's Richmond, Calif., assembly plant, which has been building sleek '52 Fords with "Model A" facilities, is due for housecleaning and expansion.

Ford officials announced last week a $2 million to $3 million program which would make it the biggest assembly operation in the Ford family. Plan is waiting only for a government OK. Top capacity would be boosted from the present 300 units daily to 500, floor area from 550,000 sq ft to 830,000 sq ft and employment from the present 1500 to about 3000. Plant now rates fifth nationally in output and has not been modernized since 1931 when it was moved from San Francisco. It supplies cars and trucks for northern California, Washington and Oregon.



"If you value your life stay away from Ed's sunburn."

The other Ford assembly plant at Long Beach, Calif., had a $1 million modernization last year and now has a rated capacity of 250 units daily. Ford also has a Lincoln-Mercury assembly plant at Maywood, outside Los Angeles, currently producing about 150 cars monthly.

Seidelhuber Loan—Seidelhuber Steel Rolling Mills Corp. at Seattle got its biggest lift in weeks when Reconstruction Finance Corp. last week approved a loan of $760,000 for its rolling mill. Together with about $1.3 million raised privately among Washington residents (to avoid Securities & Exchange Commission registration) and a $1,403,000 tax writeoff, this should finance the start-up of the venture.

Seidelhuber hopes to get the 10-in. used merchant mill recently purchased in New Jersey into operation first on billets of projectile and forging quality. As finances permit, additional units will be installed including the original 24-in. mill which is now stored on the property. Seidelhuber hopes to turn out 5000 tons per month by the end of the year and employ 250 men.

Tinplate—This week a ship will dock at San Francisco bringing enough tinplate to make 1000 freight carloads of tin cans for food packing. The supply comes from Honolulu on the *SS Alaskan* chartered by American Can Co. so that highly perishable West Coast crops would not rot on the ground.

How come Hawaii could spare so much tinplate? American Can explains that because its Hawaiian plants are so distant from the source of supply, they maintain a large inventory. It's intended to replenish island stocks within 60 days in time for the canning season there.

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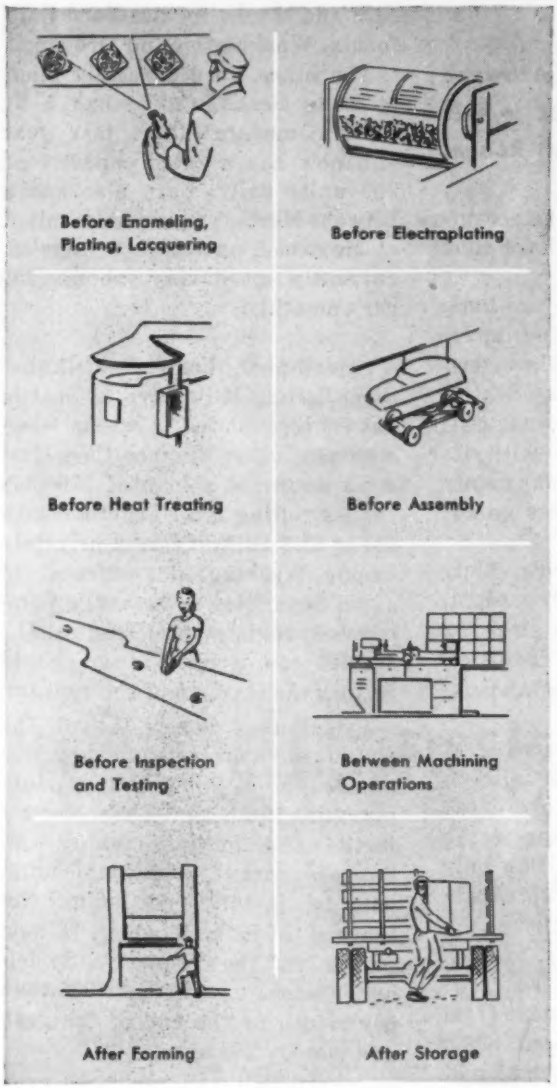

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Sell 5 Million lb of Cobalt to U. S.

In wake of lifting restrictions on cobalt exports, Silver Miller Mines contracts to sell to U. S. . . . Expands mill output . . . Easing in steel shortage postponed—*By F. Sanderson.*

Following Ottawa's lifting of restrictions on the export sale of cobalt, Silver Miller Mines, Ltd., has agreed to sell its cobalt output to America. Officials say a long term, firm contract has already been signed with Washington for the sale of 5 million lb of cobalt.

Silver Miller agrees to sell its cobalt concentrates to the United States f.o.b. the mine at Cobalt, Ont. But Canada's export regulations say only cobalt *metal* can be exported. It is understood concentrates will be smelted by Deloro Smelting & Refining Co., Deloro, Ont.

Big Increase Soon—Silver Miller Mines, the largest silver-cobalt producer in Ontario, is extending its mill capacity and plans to bring rated capacity to 150 tons daily within the next 3 weeks. When mill expansion is completed, the company hopes to produce 1 million lb of cobalt a year — plus its silver output.

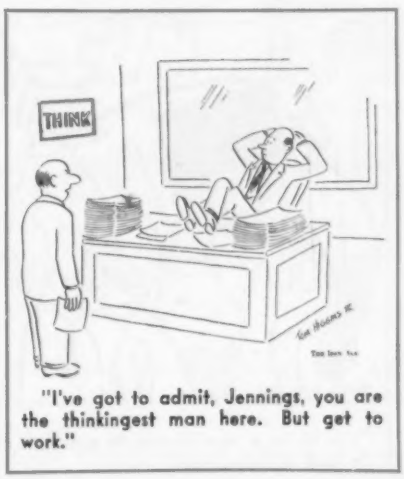
Signing of the contract with Silver Miller is yet another example of the American interest in development of Canada's mineral resources. Recently a contract was closed with the U. S. for fluorspar from Newfoundland. Some production of nickel from Falconbridge and Sherritt Gordon Mines had also been contracted for by U. S. agencies.

Shortage to Stick—The recent American steel strike, resulting in huge production losses, has dashed hopes of ending Canada's steel shortages this year. H. G. Hilton, president of Steel Co. of Canada, Ltd., said reaching a balance between supply and demand in Canada and the U. S. (which seemed probable by the end of '52) will now be some months off.

Delivery of enough iron ore before Lake navigation closes to maintain Stelco's capacity production of pig iron through winter presents a serious and difficult problem, Mr. Hilton said. Iron ore mines across the border supplying Stelco had also been strikebound.

During the first half of this year the company's production of steel ingots hit a record. Demand for all heavy products kept pace with output. But sales of certain wire, screw and bolt products are running below those of recent years.

Nickel Jackpot—Diamond drills of Falconbridge Nickel Mines, Ltd., have hit the jackpot. They have bored into one of the largest new nickel-copper orebodies found in recent Canadian mining history. In Fecunis Lake drilling (about halfway along the Levack belt of Sudbury Basin's north rim), work in one small sector indicates gross metal values running to about $250 million.



"I've got to admit, Jennings, you are the thinkingest man here. But get to work."

A clue to the importance of the Fecunis Lake deposit was obvious at the start of this year. Some 3,250,000 tons of ore was thought to be there for the taking. Further drilling has boosted ore potential to 10 million tons of better than average nickel grade ore. And considerable exploration work remains to test full merits of the discovery. Drilling has proved the deposit to a depth of 3000 ft.

The Fecunis Lake field, by far Falconbridge's largest known ore deposit along the Levack belt, is but one of five locations there.

Exploration First — American Metal Co.'s interest in the lead, zinc and tungsten section of British Columbia is getting hotter. It now plans to spend up to $3 million on B.C. mining properties if exploration work justifies it.

American Metal is in an exploration deal with Salmo Prince Mines, Ltd., whose officials say American Metal will develop the property through to production if results warrant.

Richest in Area—Inland Steel Co. plans more intensive exploration next winter of the "C" ore area of Steep Rock, which it holds under option. Eleven drilling machines will reportedly be employed by Caland Ore Co., Inland exploration subsidiary.

No work was carried out last winter. But previous drilling resulted in the official comment that "the knowledge we already have acquired about the nature of the orebody is still incomplete, but the results indicate that Inland may have one of the richest deposits in the area."

Unofficial estimates place the indicated tonnage to a depth of 1000 ft and at between 75 and 100 million tons.

Is Help Coming for Non-Rated Users?

Military may develop plan to protect civilian tool orders from rated raids . . . Would put 60 to 90-day freeze on non-rated orders . . . Investment firms fidget—By G. Elwers.

There is realization among some Washington officials that the new revision of M-41 is not entirely adequate for machine tool builders. At least, a group of military men who have visited several machine tool firms lately have asked opinions on a further revision to the machine tool distribution orders.

Substance of what this group has in mind is a freeze of non-rated orders which would protect them from the demands of rated customers. This freeze period might go into effect 60 or even 90 days before shipment.

How It Works—Prior to the freeze, the provisions of M-41 as it now exists would apply. A non-rated order could be displaced by a rated order. But after the freeze period begins for a machine, no rated order could displace it. Not even a diversion order could prevent its completion and shipment to the non-rated customer.

At least one machine tool builder feels this would be a big help. He says the way M-41 stands now, a non-rated buyer doesn't know if he will get a machine he orders until it is en route to his plant. And even then it might be diverted.

This uncertainty seems to discourage some civilian buying. Assurance that a non-rated buyer would get 60 or 90 days warning of loss of his machine would encourage more buying by civilian industries, this builder believes.

How Low?—The military visitors also questioned one builder closely on when he expected to reach his production peak, how fast he expected the decline to be and to what business level he could decline and still, after dropping subcontractors, keep his plant going full blast.

The answer was that the shipment peak was expected to come in December of this year. After that, this particular builder felt that by eliminating subcontracting he could see his business decline to half this peak and still keep his plant going strong.

Crystal Bawling—Financial advisory services, which have been recommending various machine tool stocks for some time, are beginning to lose heart. They take a dim view of the industry's future outlook.

Does this mean that expert financial analyses indicate a collapse in machine tool business is just ahead? Have these financial men access to inside information on the industry's future? No. They're just getting nervous.

"I've lit on a surefire way to get them to look at blueprints."

A representative of a well-known investment advisory firm recently admitted the industry's short-term outlook was still unclouded. But he said he got caught by a sudden unexpected drop after World War II, and he wasn't going to let it happen again.

Another service recently advised selling half of commitments in a machine tool stock. Were any sound economic reasons given for this advice? None. In effect, the service said this about its retreat: It is better to sell a stock while its prospects are good and its price high, than to wait until the outlook turns black and the price falls with a resultant loss.

New Interests—But is the outlook going to turn so black that the stock should be sold? There is no reason to assume so.

The industry has in the past been a violently cyclical one. A big bust could come. But there is increasing interest outside the industry in seeing that this doesn't happen.

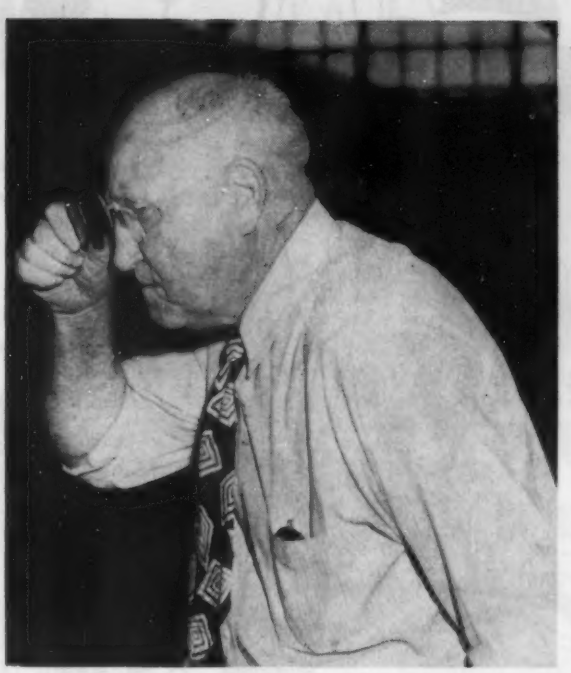
Interest of military men in what happens to machine tool builders after current defense tooling needs are met is one evidence of this fact. Establishment of the Production Equipment Advisory Commission is another. Even Congress is waking up. Senate Finance Committee recently went to bat for the industry on a point in interpretation of defense contract renegotiation regulations.

Point of View—Interpretations of renegotiation rules unfavorable to the machine tool industry were being made. The question hinged on the "per cent of useful life" and "per cent of civilian usefulness" provisions.

Industry protests reached Sen. Flanders (R., Vt.). An old machine tool man himself, he got the Senate Committee to state that the interpretation favorable to machine tool makers represented the intent of Congress.

The Iron Age

SALUTES



Carl Jernstrom

Over half a century in foundries has given this young grandpa a knack for breaking bottlenecks.

WHEN production stops, Carl Jernstrom starts. Though he'll be 75 next Christmas day, the vice-president in charge of research and development for Cooper Alloy Foundry Co. is still a young and vigorous shirtsleeve executive.

Carl made a reputation for casting ship propellers in Sweden before the turn of the century. He is one of the few men in this country who can successfully cast a stainless steel propeller.

Arriving in the U. S. in 1900, Carl started with General Electric Co. and worked for several other firms, coming to Cooper Alloy in 1932 (a testimonial dinner was given recently in celebration of his 20th anniversary with the company).

His specialties now are problems and research. Some of the work in which he has been very active at Cooper Alloy includes development of centrifugal casting methods, oxygen injection techniques and the exceptionally tough jobs like diaphragms for aircraft superchargers and ship propellers.

Carl lives with his wife Elsia in Arlington, N. J. His only son, Carl, Jr., is married and has one son. Carl is a real "Swede," tall, ruddy, with powerful shoulders and arms.

The American Foundrymen's Society, the Alloy Casting Institute, the American Society for Metals and the Steel Founders' Society all number him in their membership rolls.

Throughout the industry Carl is known as the dean of foundrymen. The old saying of "Let George do it" has been changed to "Let Carl do it."

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The Iron Age INTRODUCES

F. O. Humberger, Jr., appointed president, THE MASSILLON STEEL CASTING CO., Massillon, Ohio.

Ralph W. McGrew, elected president, BEAVER ART METAL CORP., Elwood City, Pa.; and Russell B. Cooper, appointed sales manager.

J. A. Handley, elected president, WHITING CORP., Harvey, Ill.

Allison R. Maxwell, Jr., elected vice-president - sales, PITTSBURGH STEEL CO., Pittsburgh; and Marvin J. Bair, appointed general manager of sales.

Donald Hipp, promoted to vice-president and manager, REYNOLDS ALLOYS CO.

Paul E. Shroads, vice-president, NATIONAL STEEL CORP., Pittsburgh, assumes duties of treasurer; Charles G. Tournay, becomes comptroller and asst. treasurer.

Taylor Milton, appointed vice-president, WALTER KIDDE CONSTRUCTORS, INC.

Burt C. Monesmith, elected vice-president, LOCKHEED AIRCRAFT CORP., Burbank, Calif.

W. J. Webb, elected a vice-president, OUTBOARD MARINE & MFG. CO., Waukegan, Ill.

Donald R. Guthrie, appointed executive engineer in charge of engineering research, MINNESOTA MINING & MFG. CO., St. Paul.

A. H. Eron, promoted to director of engineering, SINCLAIR RESEARCH LABORATORIES, INC., Harvey, Ill.

Hugh B. Scott, appointed chairman of the board, SHARON TUBE CO., Sharon, Pa.; and J. J. Friedman, elected president.

Gordon R. Graham, appointed administrative assistant, THE NATIONAL SUPPLY CO., Pittsburgh, and Alwyn F. Yeatman, becomes general auditor.

J. M. Parish, appointed chief engineer, Texas Div., DOW CHEMICAL CO.

William H. Old, becomes director of purchasing, THE BABCOCK & WILCOX CO., New York.

Wallace E. Anderson, promoted to division superintendent of newly created Precision Tool & Gage Div., BROWN & SHARPE MFG. CO.; and Samuel H. Waughtel, Jr., named division foreman.

Frank R. Mahurin, named ceramic technologist, ARMOUR RESEARCH FOUNDATION OF ILLINOIS Institute of Technology, Chicago.

V. H. Dearle, appointed manager, Michigan district, CARBOLOY DEPT., General Electric Co.

C. Manning Davis appointed head of Analytical Section, Research Laboratory, THE INTERNATIONAL NICKEL CO., at Bayonne, N. J.

Edward C. Vollette, appointed superintendent, drainage and metal products fabricating plant, ARMCO STEEL CORP., Middletown, Ohio.

W. B. Johnson, appointed sales promotion manager, Norge Heat Div., BORG-WARNER CORP., at Kalamazoo, Mich.

Harlie F. Byrne, appointed sales manager, ARTISAN METAL WORKS CO., Cleveland.

Frederick G. Rahe, named sales engineer, New York and New Jersey areas, Butterfield Div., UNION TWIST DRILL CO., Derby Line, Vt.

LAWRENCE LITCHFIELD, JR., elected president, Alcoa Mining Co., New York.

ROBERT S. GRUVER, elected vice-president, Armco Steel Corp., in charge of planning, Middletown, Ohio.

HORACE A. DEANE, elected a vice-president, Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich.

Personnel

Continued

Tom A. Ellington, appointed manager, Sales Promotion Dept., DETROIT STEEL PRODUCTS CO.

John H. Porteus, appointed chief engineer, LURIA ENGINEERING CO., Bethlehem.

Earl L. Prais, appointed quality control manager, THE LIQUID CARBONIC CORP., Chicago.

Charles Harmon, appointed general plant superintendent, Chrysler Detroit Tank Plant, CHRYSLER CORP., Detroit.

Raymond T. Whitzel, made general manager, Smelting Div., ALUMINUM CO. OF AMERICA.

Glendon P. Robb, appointed manager of sales, National Tube Div., U. S. STEEL CORP., New York district office.

A. Callaway Allen, appointed sales manager, Electrical Div., WAGNER ELECTRIC CORP., St. Louis. He succeeds **H. A. Hudson** who becomes sales analyst.

Fred Beitner, appointed district sales manager, TRENT TUBE CO., East Troy, Wis.

C. L. Peterson, appointed general sales manager, Industrial Div., MINNEAPOLIS-HONEYWELL REGULATOR CO., Minneapolis.

George K. Cassady, appointed assistant general sales manager, GIDDINGS & LEWIS MACHINE TOOL CO., Fond du Lac, Wis.

Charles P. Culp, appointed Atlanta regional sales manager, Finishes Div., E. I. Du PONT De NEMOURS & CO.

Howard B. Carroll, appointed assistant sales manager, SHELDON MACHINE CO., INC., Chicago.

George M. Brown, appointed district manager, Cleveland, HEVI DUTY ELECTRIC CO.

R. Mason Scheetz, appointed district manager of sales, COLUMBIA STEEL & SHAFTING CO., and Summerill Tubing Co., Div.

Ralph H. Cockroft, named special sales representative, WORCESTER PRESSED STEEL CO.

Walter S. Schamel, named district manager, Los Angeles office, AMERICAN WHEELABRATOR & EQUIPT. CORP.

J. MURRAY JOHNSTON, appointed manager, Titanium Alloy Mfg. Div., National Lead Co.

G. F. GOETZINGER, appointed vice-president-treasurer, Oil Well Supply Div., U. S. Steel Co.

JOHN W. QUEEN, appointed manager, Cleveland plant, Joseph T. Ryerson & Son, Inc.

WILLIAM F. JONES, appointed manager of sales, Chicago district office, National Tube Div., U. S. Steel Co.

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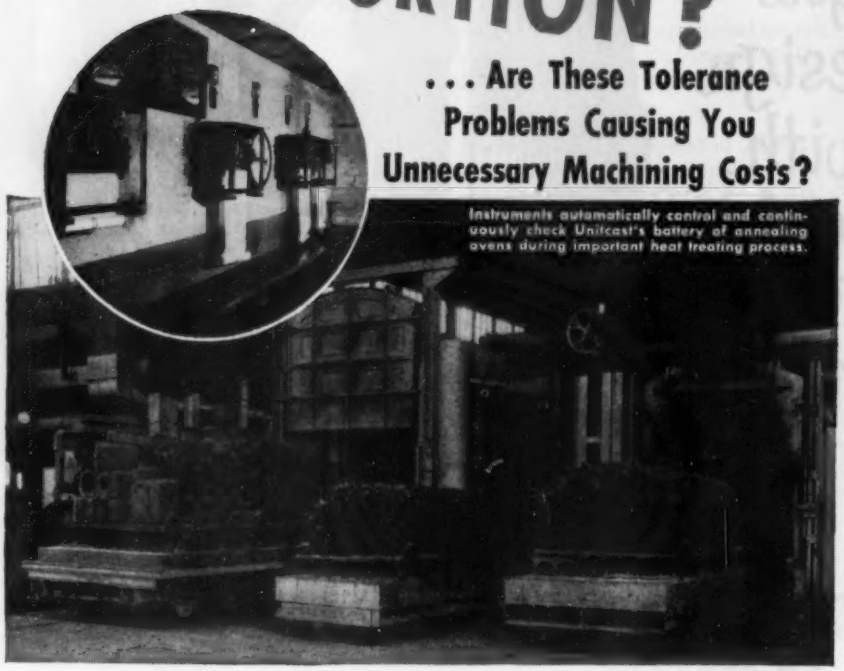
WARPAGE? SHIFTS? DISTORTION?

. . . Are These Tolerance Problems Causing You Unnecessary Machining Costs?



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Personnel

Continued

Clarence N. White, appointed to sales engineering staff, Fred R. Ramsen & Associates, St. Louis area distributor for BAKER-RAULANG CO.

Richard H. Gillespie, appointed manager, New York CMC truck zone, GENERAL MOTORS CORP.

Thomas W. Russell, Jr., appointed general purchasing agent, AMERICAN BRAKE SHOE CO., New York.

Lawrence J. Kline, elected general manager, AMGEARS, INC., Chicago.

Paul B. Foxwell, appointed abrasive engineer, NORTON CO., Worcester.

William H. Thomas named credit manager, St. Louis plant, JOSEPH T. RYERSON & SON, INC.

George Fassnacht, becomes Chicago district manager, BULLDOG ELECTRIC PRODUCTS CO., of Detroit.

Fred C. Leeming, appointed sales representative, Los Angeles district sales office, SUPERIOR STEEL CORP.

John R. Gilmartin, appointed general sales manager, Hyatt, Bearings Div., GENERAL MOTORS CORP.

J. H. Findlay, appointed manager of power and special tube engineer, Electronic Tube Div., WESTINGHOUSE ELECTRIC CORP., Elmira, N. Y.; and **D. D. Knowles**, appointed staff assistant to the manager of engineering, same division.

Joe H. Dunlevy, appointed district manager, Los Angeles office, THE GARLOCK PACKING CO.

OBITUARIES

Charles Carl Carr, 68, former public relations director for the Aluminum Co. of America, in St. Petersburg, Fla., recently.

Wallace Tenney Montague, vice-president, Norton Co., Worcester, suddenly.

Chester H. Fisher, 50, secretary and treasurer, Cowles Chemical Co., Cleveland, suddenly.

Martin P. Ostergard, 62, president, White Tool & Supply Co., Cleveland.

Harry Love, executive director, National Slag Assn., in Washington, D. C., recently.

Fred C. Sibley, 59, manager, Nash Motors zone in Boston, recently.

WHY AND HOW TO USE CO_2 IN CARBIDE TOOL GRINDING

The use of carbon dioxide as a coolant in difficult machining operations, particularly toolroom grinding of carbides, has excited much interest in recent months. But few details on actual experience with this coolant medium have been available. Iron Age presents on the following pages two articles based on considerable test and production experience with CO_2 as a coolant in grinding.

Extensive tests at the Cadillac Cleveland Tank Plant have shown CO_2 to have many advantages and to reduce direct and indirect costs as compared with grinding dry or with conventional coolants. Grinding can be done faster, yet the rate of grinding wheel wear is reduced. And the carbide is freer of heat cracks and checks, giving longer tool life. Clean conditions, handling of tools at room temperature, elimination of disposal problems, absence of fire hazard and bacteria growth, and reduced materials handling, are other advantages.

Thompson Products Co. also made tests under actual toolroom conditions which convinced them that CO_2 use was desirable. A supply method was sought which would be better than that requiring conversion units at each point of use. A central storage system was installed, low pressure at first but converted later to high pressure to solve vapor lock.

Why they use CO_2—

CARBON DIOXIDE COOLANT

Lowers tool grinding costs

By John Kwolek
Engineer
Cadillac Tank Plant
Cleveland

Extensive tests at Cadillac's Tank Plant show many advantages from use of CO_2 as a coolant in grinding carbide tools. Grinding can be done faster. Wheel life is longer. Life of tools ground is longer. Grinding is cleaner. There are no disposal, sanitation, or fire hazard problems. Surface finish is better. Materials handling is simplified. Cost is relatively high.

The use of carbon dioxide as a coolant in carbide tool grinding has proven itself in extensive tests at Cadillac Cleveland Tank Plant. Advantages are many and cost comparisons with standard coolant or dry grinding are favorable when due precaution against waste is exercised. The method has been under development in the plant's laboratory for several months.

The utilization of CO_2 as a coolant in the field of tool grinding and sharpening has presented many advantages. These include cleaner grinding conditions, handling of carbide tools in a cool state and at room temperatures, elimination of disposal problems, and controlled coolant temperatures. These and other indirect conditions have contributed to the burden of grinding carbide, making this phase of any operation a costly item of consideration.

The results and data obtained, from various experiments and developed applications of the CO_2 method of cooling have not only borne out the advantages described but have shown direct monetary savings. These come primarily from faster grinding, increased efficiency and a direct reduction in the amount of carbide tool cracking due to grinding.

Principles of adaptation and application are relatively simple with the various forms of supply available today. When received in a solid form of dry ice, CO_2 when it absorbs heat is converted into a liquid form in a pressure sealed liquidor, forming its own pressure at approximately 800 to 1000 psi. When received in a bulk unit as a liquid form, the conversion is elimi-

ADVANTAGES OF CARBON DIOXIDE

Longer wheel life . . . one test showed, on the same job, 11 wheel dressings required with conventional coolant to every one when CO_2 was used.

Better tool life . . . heat cracking and checking of carbide reduced.

Cleaner conditions . . . CO_2 dissipates into the air, doesn't cause rust, promote bacteria growth, require disposal, coat salvagable material.

Control . . . close control of rate of flow and of temperature permits close control over rate of heat removal from grinding operation.

Less handling . . . supply can be through pipes from a central location, reducing materials handling.

nated and pressure control can be utilized through pumping. From these liquid sources, CO_2 is brought into contact with the work through controlled size orifices, varying from 0.006 in. openings on up, according to need.

Upon ejection into atmosphere, liquid CO_2 is transformed into minute particles of dry ice snow. In conjunction with various types of orifice controls, this CO_2 is directed to tool contact areas. Here in changing from solid to gas the CO_2 absorbs the heat generated by tool action and carried it off to be dissipated into the air.

Temperature, pressure control

Unlike other coolants, CO_2 permits a positive temperature and pressure control, making possible standardization involving a measured flow at constant temperatures to relieve thermal stresses set up in carbide during a grinding operation. This relief reduces the amount of carbide cracking by not allowing carbide tools to heat up to a point where the temperature increment becomes large enough to cause cracking from thermal stresses. Controlled and stable temperatures practically insure dimensional and metallurgical stability.

With a balance maintained by positive operating controls and the elimination of burdens such as handling, labor, storage problems and waste due to handling and storage, the usage of CO_2 can be rated at approximately 95 pct efficient. The proper application of CO_2 will permit visual control while grinding. Tools can be ground completely without going through a cool-off period as is prevalent in dry grinding when tools have to be set aside to cool off during grinding operation. Simple automatic valving can be set up to cut down the use of CO_2 to a minimum during tool checking periods or other normal interruptions which occur during working hours.

No disposal facilities are required. The CO_2 dissipating into the air with its absorbed heat completely eliminates any disposal burden. Also, the problem of salvage is made easier since CO_2 will not combine with nor coat salvageable materials, eliminating separation problems.

Grinding wheel life longer

One phase of extending tool life is the increase of grinding wheel life. Reduction of wheel consumption, during carbide and other hard material grinding, is obtained due to the absence of excessive heat preventing the steel from fusing into grinding wheels. This means less dressing of wheels. A preliminary report, taken during early experiments, showed wheel dressing was required 11 times under ordinary grinding conditions, compared to one time when CO_2 was used as a coolant. Comparison was made under similar conditions.

Another phase of tool life pertains to the carbide or other hard materials which have been ground using CO_2. The sharp reduction and possible elimination of cracking and checking of these materials extends their life.

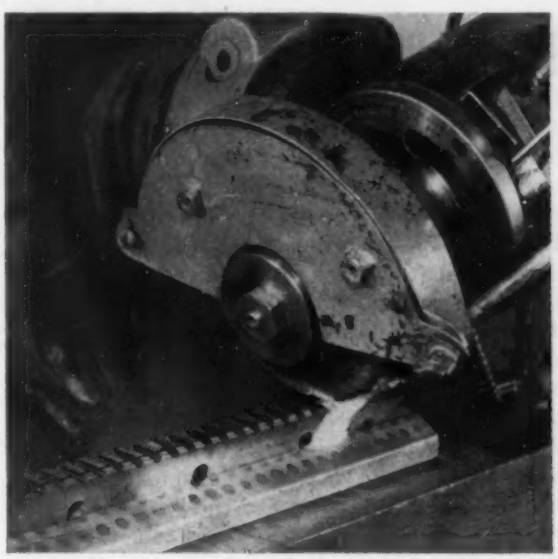
Removing stock faster with a better finish has been realized during rough grinding tests. For finish grinding with its severe microinch specifications, the use of CO_2 coolant with diamond wheels has made many jobs practical in a shorter time yet with a sharp reduction in wheel disintegration despite heavy feeds. Since the burning problem in grinding carbide is reduced or eliminated when CO_2 is used, more grinding pressure can be applied. More pressure means more stock removed.

Considering good housekeeping, cleaner conditions can be realized. The pressure of CO_2 blows grinding dust away from operators during off-hand grinding operations. As against wet grinding, there is no splatter or rust problem to contend with. From the cleanliness and health standpoint, it is important that bacteria growth is not a problem with CO_2. Thus CO_2 has the capability of removing heat generated in grinding without the dirt and sludge that accompanies a wet grinding operation.

Cost relatively high

There are other advantages of CO_2. There is no fire hazard involved. In fact CO_2 is used to put out fires. Utilization of a central system is not only possible but relatively simple, which confines materials handling to a central location with the coolant being piped to locations where it is used.

The relatively high cost of CO_2 as compared with common liquid coolants is a factor which must be considered. It is necessary that strict attention be paid to hold waste to a minimum. When this is done the advantages of CO_2 use can outweigh the cost.



BROACH GRINDING on LaPoint broach grinder, using CO_2 at point of wheel contact as coolant. Both carbide and high speed steel broaches are ground with this coolant. Photo taken at Tapco plant of Thompson Products, Inc., Cleveland.

How they put CO_2 in action—

CENTRAL SYSTEM DISTRIBUTES CO_2 Coolant for Grinding

By P. S. Cerne, Staff Industrial Engineer and C. O. Parrat, Staff Methods Engineer

Thompson Products, Inc.
Cleveland

Extensive tests have sold Thompson Products, Inc., on use of CO_2 as a coolant in grinding carbide tools, carbide and high speed steel broaches. Experiments on other machining uses are being made. To get away from individual CO_2 units at each point of use, Thompson has installed a central storage tank from which a high-pressure pump feeds pipelines to points of use. High pressure prevents vapor locks and nozzle clogging. Open type wheel prevents wheel icing. Nozzles are fan type to cover entire width of wheel.

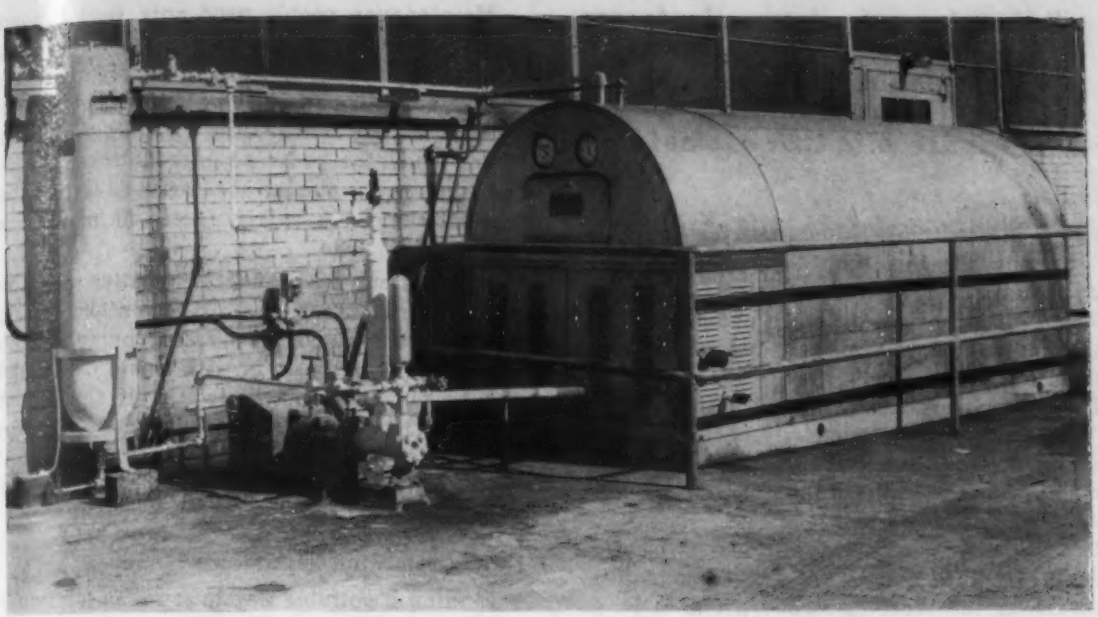
Thompson Products, Inc., Cleveland, has been conducting tests using liquid carbon dioxide as coolant on various grinding and machining operations for over two years. The most success found with this relatively new method of cooling has been on the grinding of carbide tools. One of the unique aspects of the operation at Thompson Products' Tapco Plant is the installation of a centralized CO_2 supply system.

Thompson Products has found the use of liquid CO_2 well suited for the grinding of carbide tools. Major difficulty in grinding carbide tools occurs when heat generated by grinding causes thermal cracking of the tool due to the low thermal conductivity of the carbides. Because of this, dry grinding of carbide tools often requires air cooling between the grinds, particularly when much carbide stock must be removed. These air cooling periods cause time to be lost. Application of liquid CO_2 as a coolant in grinding makes air cooling unnecessary.

When a stream of liquid CO_2 is directed about 1/16 in. behind the line of contact of tool and wheel, heat is removed at the point of generation. Removal of heat at this point prevents burning and thermal cracking of the carbide. Because CO_2 rapidly dissipates the heat generated by grinding, very heavy wheel pressure can be exerted. More stock can be removed per unit time resulting in a reduction of actual grinding time.

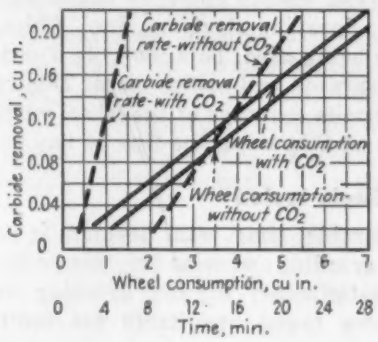
Increasing interest being shown in the use of liquid CO_2 has focussed attention on the problem of properly delivering the coolant over a large plant area for various operations. When the coolant is required at several locations in a plant, utilization or dry ice converters as a source of supply becomes a materials handling problem.

These cumbersome containers weigh 600 to 4600 lb empty and thus are not readily portable. Some other method of delivering liquid CO_2 is necessary because it is not economically sound to install one or a battery of such vessels mani-



CENTRAL carbon dioxide system at Thompson Products. Storage tank, right, receives CO_2 from tank truck, stores it at 300 psi. Pump, center, raises pressure to 900 psi and keeps accumulator, right, full. This supplies lines in plant.

WHAT SOLD THOMPSON ON CO_2



Rough grinding tests were made with two Ex-Cell-O off-hand grinders on production grinding of carbide tools rather than under closely-controlled laboratory conditions. Differences in grinding skill were eliminated by using the same operators for the CO_2 tests that do dry grinding.

A total of 4800 tools of 161 various designs and carbide grades were rough ground with CO_2 and comparison of grinding time with standard hours for dry grinding was made. Using CO_2, grinding time was 298 hours, against 710 hours for dry grinding, a 58 pct saving. On some work the time savings were as high as 75 pct.

CO_2 is also used at Thompson on grinding difficult carbide and high speed steel broaches. Although there is no decrease in grinding time on these tools, this is of secondary importance to improving the finish. In grinding broaches the CO_2 coolant was able to reduce flaking on the cutting edge of the broach teeth, thus increasing broach life.

The graph above is based on Thompson tests with CO_2 coolant.

folded together at each piece of equipment where CO_2 might be used only intermittently. Furthermore, continued surveillance of each unit is needed to determine when the supply is running low and refilling necessary.

To overcome this difficulty, Thompson Products has devised a centralized delivery system which pipelines the liquid CO_2 to various plant outlets. At present lines are installed only to the tool room where grinding operations are performed, but they can be easily extended to manufacturing areas when and if the practice becomes standardized on machining operations. Meanwhile, individual units serve these operations when CO_2 is used.

Thompson, working with engineers of Pure Carbonic Div. of Air Reduction Co. in setting up the system, attempted to find some way of adapting existing CO_2 supply equipment to the problem. Because of the ease with which it is stored, thoughts turned to the use of a low temperature bulk liquid supply. Bulk liquid receivers ranging from 3 to 60 tons capacity were already available. Such receivers could be installed outside the plant to save working space, and the liquid CO_2 pipelined from them to the desired locations.

In attempting to apply the bulk delivery system several problems were encountered. Expansion of CO_2 at the nozzle formed dry ice and impeded the flow. It was found that the pressure of 300 psi inside the vessel or receiver was not high enough to blow out dry ice clogged in the nozzles then being used. Also, the 300-lb pressure in the process pipeline permitted the heat which infiltrated the line to vaporize the liquid CO_2. Vapor locks formed in the line and made

"Abrasive wheel manufacturers are developing semi-open wheels . . . for use with CO_2 coolant . . ."

the flow intermittent. Efforts to overcome this by covering the line with 4 in. of insulating material failed to solve the problem. It was decided to utilize a high pressure pump in series with a high pressure accumulator tank to reach desired pressures.

The centralized supply system now installed at Thompson consists primarily of a low pressure bulk liquid receiver, the high pressure pump and high pressure accumulator tank, and pipelines extended to points of use.

The 7000-lb capacity bulk receiver is located outside the plant and is filled by tank trailer. Pressure in the receiver is 300 psi at 0°F. A refrigeration unit in the bulk tank keeps the liquid CO_2 at 0°F. The high pressure pump boosts this pressure to 900 psi at 0°F and transmits it to the accumulator tank at the rate of 1000 lb per hr. Capacity of the accumulator tank is 150 lb of liquid CO_2. Pressure is maintained in the accumulator and lines at 900 psi. When the accumulator tank is filled, a mercury switch automatically cuts off the pump.

The use of liquid CO_2 at 900 psi enables the liquid CO_2 to withstand the infiltration of heat. The greater pressure resists vaporization, thus alleviating the need for insulating the line. It also supplies enough pressure to prevent clogging and give proper performance during the grinding and machining operations. This high pressure system makes it possible to pipeline liquid CO_2 over large plant areas.

USING CO_2 in broach grinding operation. Individual units, background, to supply CO_2 are being replaced by lines direct from central storage point. When individual units at machine are used, they are filled at the central storage tank.

Maintenance people need only read the one liquid level gauge at the bulk to determine when a refill is needed. The entire supply system is blanketed with pop safety valves set at 1200 to 1400 psi, which releases the CO_2 into the atmosphere when the pressure exceeds these limits. All lines and material used are tested to withstand 3000 psi, a safety factor of more than 100 pct.

The system also enables smaller portable units to be filled more easily. An outlet between the bulk tank and high pressure pump permits the filling of these units with liquid CO_2 which can be put into immediate use. It thus eliminates the need for charging converters with dry ice and delay due to the sublimation time of 12 hr for conversion from solid to a liquid and gas CO_2 mixture.

Nozzle selection important

Finding a suitable nozzle is of major importance in off-hand grinding. Thompson first tried two small-drilled nozzles that discharged a conical stream but found the amount of CO_2 needed to cover the entire width of the wheel was greater than that required to cool the grinding operation. It was decided that a fan-shape stream was the best pattern for off-hand grinding.

A fan-type, smooth entrance nozzle manufactured by Spraying Systems, Inc., Chicago, is presently being used. This comes in a variety of angular spreads and orifice sizes. This type of nozzle permits coverage of the wheel width by a thin belt of CO_2 along the line of tool contact.

Many wheels tested

Considerable time was devoted to testing various grinding wheels for use with CO_2. Wheels satisfactory for dry grinding were in many cases found unsuitable for continuous operation when the coolant was employed. Major difficulty was the tendency to load the wheel with carbide particles suspended in dry ice. Ice formation is produced by condensation and freezing of the moisture from the air band that is carried by the surface pores of the grinding wheel. Frequent dressing of the wheel was necessary because of uneven wear resulting from ice formation.

It was found that an open or semi-open wheel was best for CO_2 grinding. Centrifugal force causes the open type wheel to draw in air through the pores in its sides and flush it out through the periphery. This action provides a flow of air that carries off the water condensate and resists freezing. However, open wheels break down more rapidly than conventional ones because of their lower bonding strength. At present, several large abrasive wheel manufacturers are developing semi-open wheels having stronger wearing surfaces for use with CO_2 coolant.

Chrome Carbide has UNUSUAL PHYSICAL PROPERTIES

An unusual combination of properties exhibited by grade 608 chrome carbide, first of the new series 600 cemented chrome carbides produced by Carboloy Dept. of General Electric Co., is expected to lead to wide application of the new man-created metal. Successful applications have already been made for gage blocks, bushings, fish rod guides and other parts requiring high resistance to corrosion, erosion, and abrasion. Made by the powder metallurgy process, the metal is lightweight, has a coefficient of thermal expansion approximately the same as steel, is non-magnetic and has extreme resistance to high temperature oxidation.

The new metal is composed of 83 pct chrome carbide, 2 pct tungsten carbide and 15 pct Ni. Density is about half that of tungsten carbide.

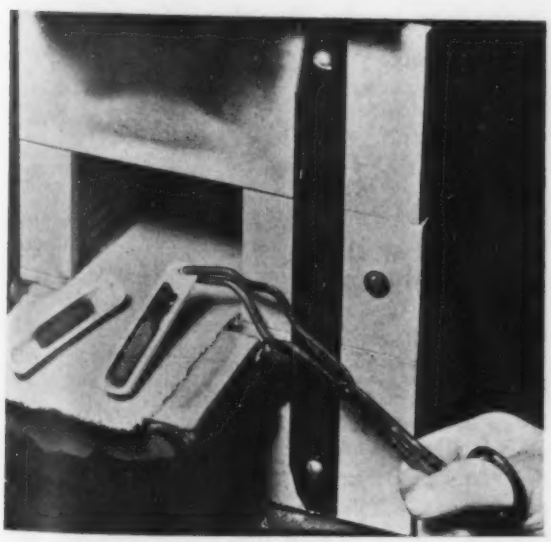
Salt spray tests conducted at Battelle Memorial Institute reveal that series 600 chrome carbides retain their metallic lustre after being subjected to a 30 pct salt spray for 750 hr.

When subjected to sulfuric acid corrosion tests, Fig. 2, series 600 chrome carbides show 30 times the resistance of 18-8 stainless steels and 3 times the resistance of conventional carbides. Resistance to nitric acid is 8 times that of other carbides and twice that of 18-8 stainless steel.

The chrome carbides resist oxidation at temperatures up to 1832F. When subjected to a temperature of 1850°F for 24 hr samples are only slightly discolored, while samples of stainless steel and tungsten carbide have completely disintegrated.

PROPERTIES OF GRADE 608 CEMENTED CHROME CARBIDE

Hardness	RA 88
Density	— 7.8 gms/cm³ (slightly lighter than SAE - 1095)
Transverse Rupture Strength	— 100,000 psi
Compressive Strength	— Higher than most hardened steels.
Coefficient of Thermal Expansion	— 6.4 x 10-⁶ in the range of 70°-1292° F.
Abrasive Resistance	— Good - less than tungsten but much better than hardened steels.
Resistance to Oxidation	— Slight surface discoloration after 24 hr in air at 1800° F.
Resistance to Corrosion	— Excellent
Magnetic Permeability	— Nonmagnetic



AFTER EXPOSURE to air for 24 hr at 1850° F, grade 608 chrome carbide sample, left, resists all oxidation while sample of stainless steel, right, disintegrates.

Steam erosion tests show a resistance for chrome carbides about 50 times that of conventional carbides. Samples 1½ in. in diam and 0.250 in. thick were placed ½ in. in front of a 350 psi jet of saturated steam passing through a 1/16 in. diam. nozzle for 25 hr periods. Four tests of 25 hr each show no measurable erosion penetration on the chrome carbide samples after the first three tests. Maximum average penetration after the first 100 hours is 0.0004 in. Because costly and critical tungsten and cobalt are not constituents of grade 608 chrome carbide, it is expected complete parts can be economically made of solid chrome carbide.

Methods of fabricating tungsten carbide are applicable for grade 608 chrome carbide. Components can be molded to shape for standard or quantity parts. They can also be economically machined to required shapes in the presintered condition for small lot production.

Grinding, lapping and polishing of chrome carbide is performed with conventional silicon carbide grinding wheels, diamond grinding wheels and diamond lapping compounds. Polished surfaces of chrome carbide have a more brilliant lustre than those of tungsten carbide.

Grade 608 chrome carbide can be attached by brazing, by mechanical means or by thermosetting resin cements. It is necessary to flash plate chrome carbide parts with nickel for brazing with conventional materials. In general, resin-cemented joints can be used in place of brazed joints where high strengths are not required and when the application operates at room or slightly elevated temperatures.

Worked hot, cold and fast—

Novel Press Setups PRODUCE COLD-DRAWN, HOT-FORGED PARTS

By A. B. Mooers
Manufacturing Engineer
Buick Motors Div.
General Motors Corp.
Detroit

An unusual cold-drawing hot-forging press setup is used by Buick Motors Div. to turn out a hard-to-make rear axle housing flange. SAE 1008-1020 hot-drawn plate blanks are tumble blasted before drawing. All cold operations except blanking are done in four dies mounted in one Toledo 96-B press. A Surface Combustion rotary furnace fast heats the partly formed parts in a scale inhibiting atmosphere. Hot-working is completed in a 1300-ton Ajax forging press. Slides and chutes speed moving of parts from open operation to the next. A 6-man team handles the entire setup, turning out 365 completed parts per hour.

Every rear axle housing for a chassis produced by the Buick Motor Div., General Motors Corp., Flint, Mich., requires a flange at each end. These flanges are integral with short tubular hubs subsequently flash welded to the tubes.

The ⅜-in. flange, Fig. 1, is thicker than most of the wall of the short integral hub, which ranges from 3/16 to 5/16 in. in wall thickness. The radius where the flange joins the tube is only 1/16 in. however. It would be nearly impossible to produce such a part cold on conventional stamping presses, hence they are used for the first five operations only. The remaining three are done hot, including two in a forging press, where the major changes in section thickness are effected and the 1/16-in. radius is formed.

Flanges are made from SAE 1008 or 1020 hot-drawn steel plate or equivalent, the circular blanks being 5/16 x 7¼ in. They are tumble blasted before drawing. Fig. 2, the lower row, shows the blank and work pieces after the first three draws. In the top row, left to right, are shown successively the piece after the final cold draw and pierce, after the two hot forging operations and after final pierce and trim, done while the piece is still hot.

All cold operations, save blanking, are done in four dies mounted in a single Toledo 96-B press, as shown in Figs. 3, 4 and 5. This is an

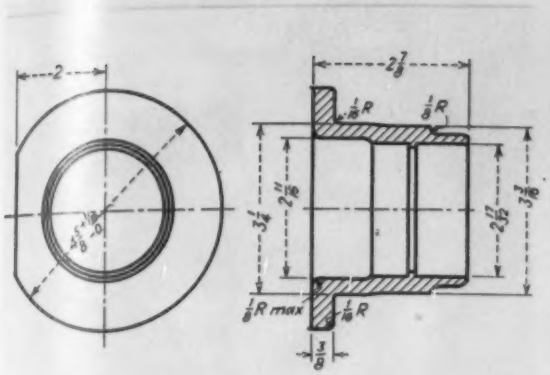


FIG. 1—Drawing of flange with tubular hub which is welded to the ends of Buick rear axle housings. Part is shown after cold-drawing and hot-forging operations. Note variations in the section thickness from end to end of housing.

FIG. 3—Blanks are ready for feed along slide into first draw position, are then pushed through die ring into chute.

unusual as well as a very fast setup, partly because it involves special slide feed and automatic extractor setups that contribute both to speed and to safety.

For the first draw operation, Fig. 3, the press operator places a blank in the slide and uses it to push the prior blank into draw position without putting his hands in the die. Upon closing, the first round nose punch pushes the blank through a ring to form a shallow cup. This drops through the base of the die and into a chute. From the chute, the cup is picked up and loaded into another slide, center in Fig. 4. From here the cup, bottom up, is pushed by other cups into the first redraw die.

When the die closes, the redraw occurs in a ring on the ram, after which an extractor removes the redraw part and drops it in a chute for transfer to the opposite side of the press.

By the use of a slide, hands are kept out of the die. An identical procedure is followed by the second operator for the second redraw. The work piece is pushed along the slide, right center, Fig. 5, and into the second redraw. Here the cup centers itself on the punch and is pushed by it into a ring on the ram.

A mechanical extractor removes the part from the die and drops the part into the chute at left center. This completes cold drawing but the second operator picks up the work piece, turns it over and loads it, via chute, into a die to pierce the central hole. Slugs fall through the die, and the work piece is ejected and placed in a rotary furnace. The slugs are salvaged and are used as primary stock in making two other

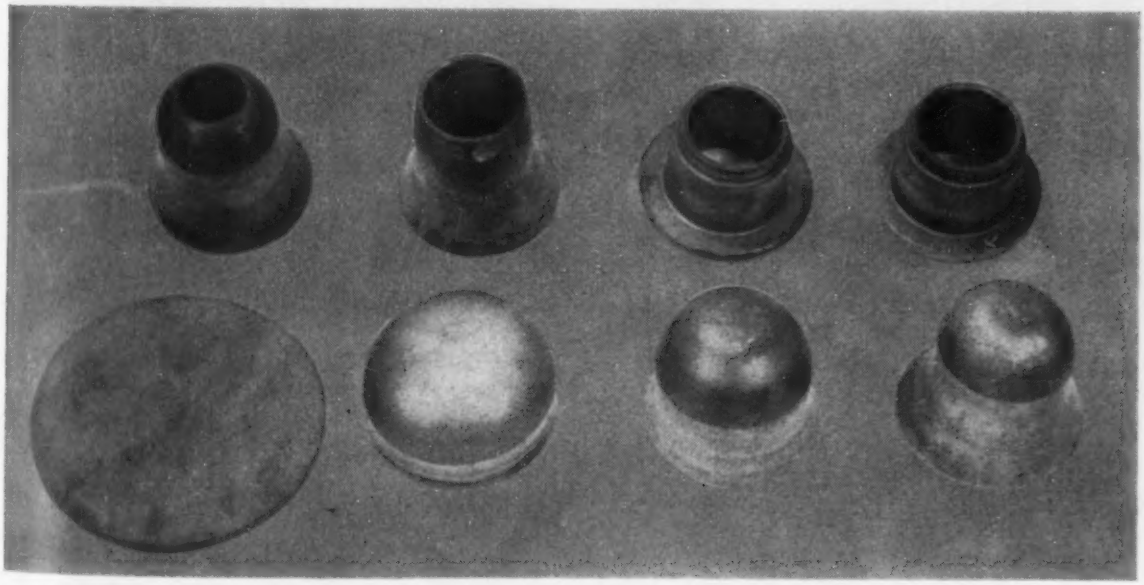


FIG. 2—Stages in axle flange production: Lower row, left to right, 5/16-in. blank, first, second and third draws; upper row, cold-pierced, first and second hot-forgings and final trimming to remove flash.

"Some upsetting increases flange thickness by 1/16 in. over that of the original blank . . ."

parts which are manufactured at this plant.

Each operator must press two buttons, one with each hand, and all four buttons must be pressed at the same time to trip the press. Blanks and work pieces always are at hand to insure quick loading of slides. Some 365 pieces an hour are put through the press.

To minimize formation of scale and to promote longer life on forging dies, the rotary Surface Combustion furnace is designed for fast heating. RX generators supply an atmosphere which inhibits scale formation. Parts are brought up to 1500°F in slightly less than one full revolution of the hearth and, for every part loaded, one is ready for removal and forging.

One man loads and unloads the furnace and places hot parts in the first station of the 1300-ton Ajax forging press die, Figs. 6 and 7. At this station, right, Fig. 7, the tapered punch extrudes the tubular portion, varying its wall thickness and enlarges the hole pierced in the final cold operation. Some upsetting increases flange thickness by 1/16 in. over that of the original blank. After the end of the first forging stroke, a knockout loosens the work piece and the press operator removes it with tongs and places it in the second die, left, Fig. 7, in the same press.

In the second forging stroke the stepped punch completes sizing of the tubular wall. An oil-graphite lubricant is squirted onto the extruding die. The upset forging is lifted from the second die, right, and drops it into a chute that takes it to the trim press, Fig. 8.

FIG. 5—After first redraw, cups taken from chute, lower left, are fed from slide, right center, onto punch for second redraw. Parts then feed to die, left center, for piercing hole in bottom of part. Slides eliminate tote boxes.

Trimming removes flash formed at the flange and cuts a flat at one side of the flange. The completed forging is removed by tongs. Rings of flash feed down until sheared in half, they fall

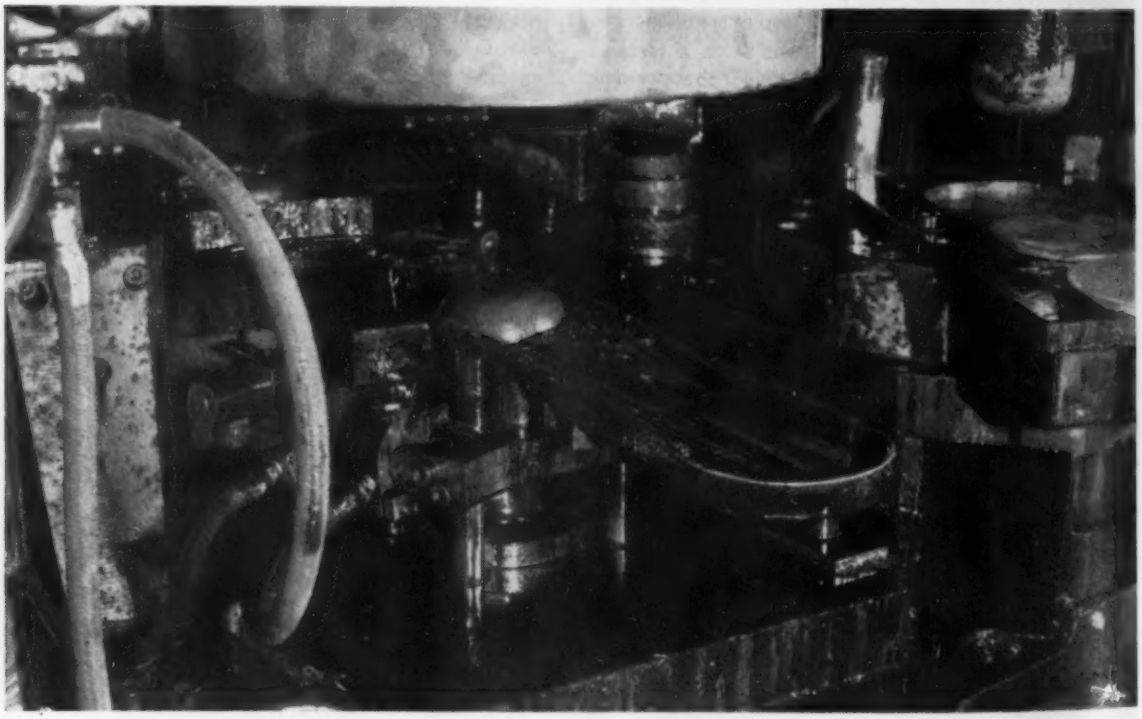


FIG. 4—Cups taken from chute, lower right, are placed in slide, center, and feed onto punch for first redraw. Mechanical extractor drops redrawn parts into chute leading to other side of the press.

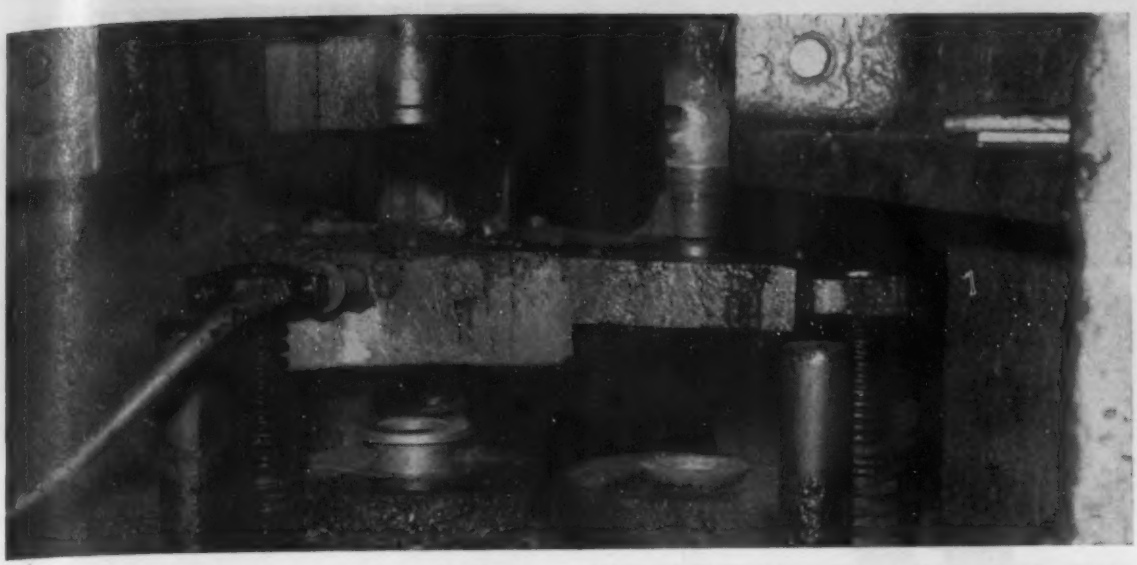


FIG. 6—Operator's side of two-place die in Ajax forging press. After cold-formed cups are heated, they are placed in die at right of hub wall, then in left die for upsetting flange and finishing hub.

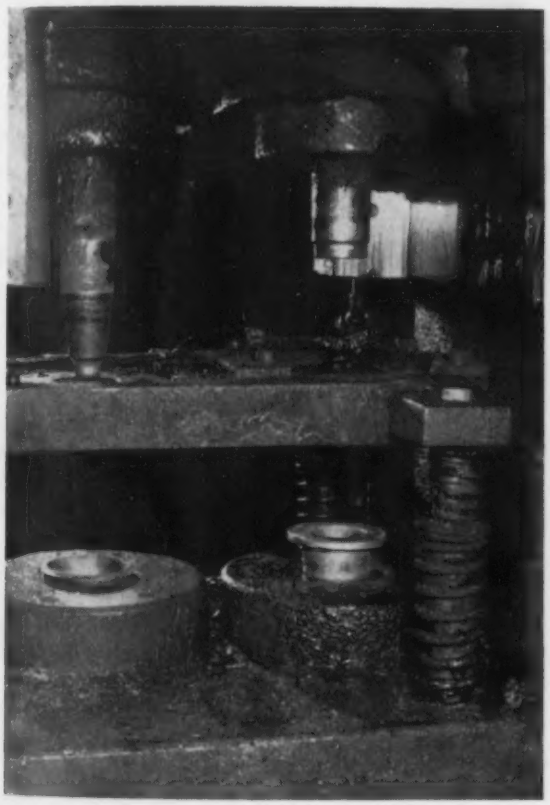


FIG. 7—Forging dies from helper's side, showing two punches elevated and a forging in each die. Operator removes piece from first die, left, to second die.

FIG. 8—Closeup showing hot-forging after flash has been sheared off in trim die. Rings of flash are sheared in two and fall down the sides of the die.

off the sides of the die. All hot operations keep pace with cold drawing operations, 365 pieces an hour.

Aside from shearing blanks from plate stock, total direct labor required includes two men at the stamping press, one on the furnace, two on the forging press and one on the trim press. After leaving the department, the flanges are shot blasted and then are ready for welding to the ends of the axle housings.

Better heat treating BORN IN RESEARCH

By C. L. West
Vice President
Electric Furnace Co.
Salem, Ohio

Rapid advances in speed and quality of continuous heat treating operations stem from research such as that done in the production-type heat treating laboratories of Electric Furnace Co., Salem, Ohio. Research aims to set up operating procedures which can be readily duplicated in the field. Strip products in lots up to 500 tons are continuously processing equipment.

Rapid advances in the speed and quality of continuous heat treating operations are backed by years of intensive research into the methods and equipment which make these operations possible.

Typical of the type of research work which makes modern heat treating processes possible is that done by Electric Furnace Co., Salem, Ohio. Materials for furnace construction and heat treating results and methods systematically studied at the company's laboratories since 1923. Study of special atmosphere furnace reactions was started in 1931.

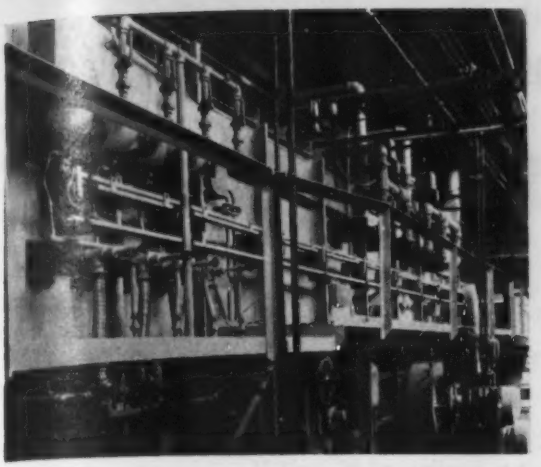
Research projects originate with customers, manufacturers and Electric's own engineers. After preliminary data is assembled, each project resembles as nearly as possible a production line operation. Aim is to set up an operating method which can be readily duplicated in the field.

An electrically heated, atmosphere type, continuous furnace has been used since 1931 for a variety of experimental operations. Work end opening is 8 in. wide x 4 in. high. A controlled cooling hood is used in place of the conventional water-cooled hood. It is used for bright annealing followed by discharge to air or steam. It permits discharge to room temperatures below the temperature at which the metal would discolor. Steel strip can be produced with a uniformly tight oxide coating as required in products such as stove pipe iron.

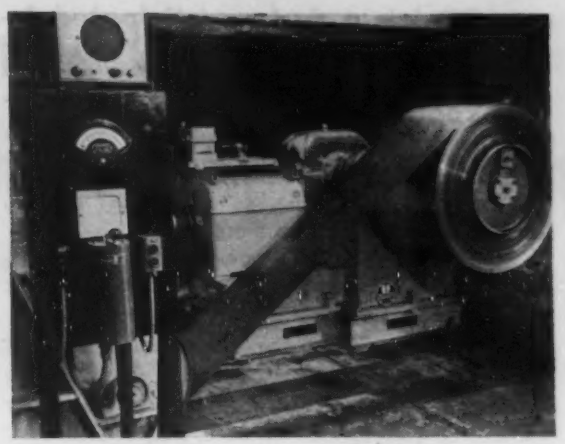
Silver soldering, copper brazing and sintering of metal powders have also been studied. One of the earliest continuous production annealing furnaces for motor and transformer laminations resulted from experiments made here in 1932. Temperatures, cycle and atmospheric conditions which would insure improved electrical characteristics and desirable surface oxides were obtained.

Bright anneal of stainless steel shells, silver soldering and copper brazing of high chromium steel products without fluxes are possible with adaptors.

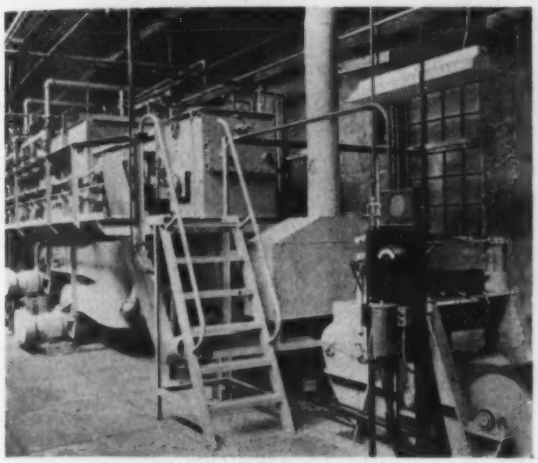
Dry cyaniding, carburizing and hardening of medium and high carbon steel parts with control of surface carbon have been studied in a



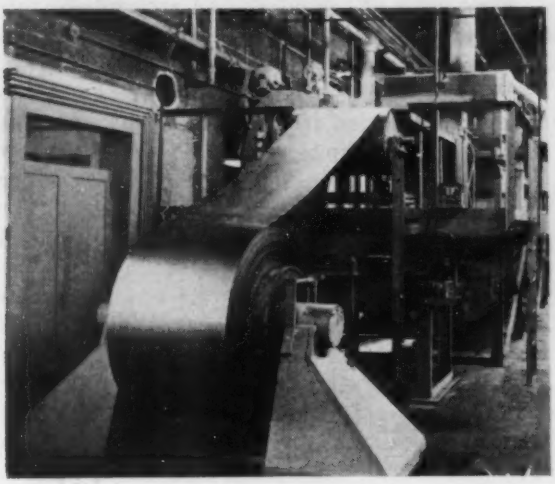
CLOSEUP VIEW of first zone of atmospheric controlled heating furnace. Zone operates at temperatures to 1850° F.



TENSION on strip is maintaind with Reeves automatic tensioning unit. Start, stop and speed are controlled here.



DISCHARGE END of furnace includes lined cooling section with large diameter rolls for pass lines through forced cooling zones, discharge vestibule, bridle rolls and a coiler.



CHARGING END of the strip heat treating line as seen from cone payoff reel. Thermocouples register strip temperatures on trip through furnace.

semicontinuous pusher tray type gas-fired radiant tube heated furnace with elevator type quenching equipment. This installation handles moderate production lots.

Special setups are used to study oil and gas burners, direct fired and applied to radiant tube heaters. Probable life of radiant tube heaters and electric resistors and other heat resisting alloy parts at high temperatures and in unusual atmospheric conditions have been determined. Examples are alloy parts forming dry bearings under heat and various load conditions.

Prior to 1949 research on strip products was hampered by existing equipment. Several tinplate strip producers had expressed a desire to heat treat a considerable tonnage in gages and widths which could be further processed into commercial sizes. This led to construction of the present production type equipment.

Data was lacking on heat absorption rates for various surface conditions, annealing and normalizing temperatures, soaking time at temperature, cooling rates through the lower critical ranges, and the time element for cooling to the low discharge temperature required in the production of strip steel for tinplate. Most desirable furnace atmospheres for processing were more or less unknown and could only be determined in production type equipment.

Furnace equipment is designed to permit flexibility in heating, soaking and cooling rates. Automatic controls record temperature changes through the heating and cooling zones, registering temperatures from a thermocouple attached to the strip being processed.

Charging end of the line is equipped with a hydraulically operated cone payoff reel. A Morrison stitcher is followed by a carpet type air-operated brake and the charging end of a flame impingement furnace.

Burners in the flame impingement section are used to burn off the film of roll oil, uniformly preheating the strip to about 800°F.

Where a film of clean palm oil has been burned off, preheating the strip to 600°F, strip will process through electrolytic tinplating as well as strip cleaned with electrolytic type cleaners prior to annealing. Strip rolled with dirty oil,

"Original design anticipated future use of the equipment as a coating line . . ."

or strip which has become dirty after rolling, cannot be cleaned by this method.

Burning off oil film prevents buildup of H_2 and CO in the atmosphere of furnace equipment following the flame impingement heater. An important function of the flame impringement heater, when used for preheating, is to ensure uniform strip color as it enters the following controlled atmosphere furnace. Bright and dark spots would lead to nonuniform annealing because of the time difference for heat absorption between a bright and dull finish.

First zone of the controlled atmosphere furnace is heated with gas-fired radiant tubes. Operating temperature is about 1850°F. A 9-in. refractory baffle separates the first and the electrically heated second zone. Zone 2 operates at temperatures up to 2100°F. Two zones follow for soaking at temperatures to 2100°F or for controlled cooling.

At the discharge end of the furnace is a lined cooling section. Rolls allow for a pass line through the first and second forced cooling sections, through a discharge vestibule, bridle rolls and on to a tension coiler. The strip travels on chain driven hearth rollers synchronized for surface speed through a central drive mechanism. Lots of strip from tinplate producers, in quantities up to 500 tons, have been processed.

Practical values for deep drawing steel strip, from a continuous strip processing line, have been determined on this equipment by annealing, normalizing and controlled cooling. The effect on strip flatness when force cooled from relatively high temperatures down to suitable discharge temperatures has been studied.

The equipment has been used extensively to anneal brass and bronze strip with controls of the surface and grain size. Practical aspects of bright annealing of such material have also been explored.

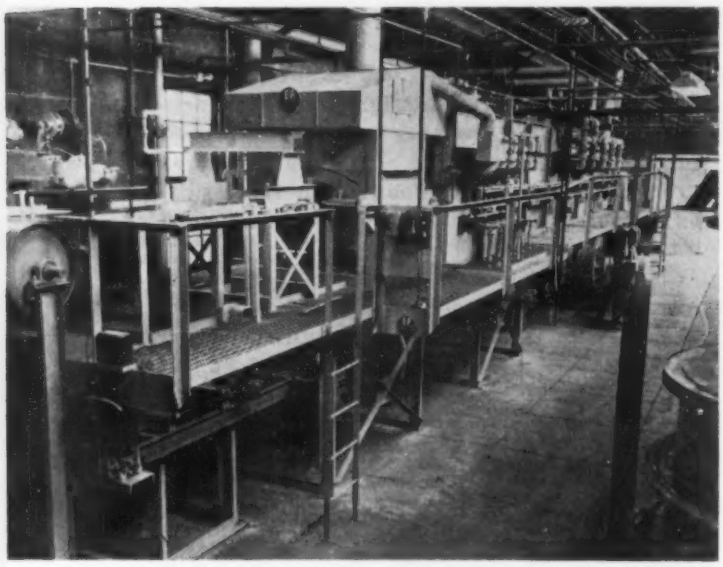
Original design anticipated future use of the equipment as a coating line. Present facilities permit handling 0.020 in. coils in widths to 28 in., from 16 to 20 in. ID and weighing up to 4 tons.

Special equipment for study of controlled gas atmospheres includes exothermic and endothermic generators, dehydraytors and facilities for production of N_2 and H_2.

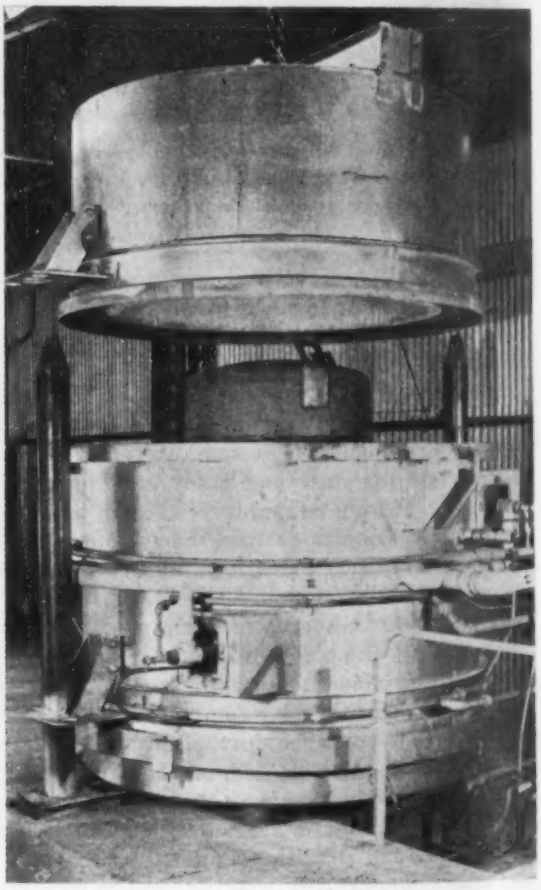
A portable visual testing machine has been developed to determine the quality of gas from gas producing equipment, and in the furnace.

Sulfur in furnace atmosphere, detrimental to bright annealing operations, may come from the atmosphere fuel gas roll oil, or even from the furnace lining. Presence of sulfur can be quickly detected with the visual tester.

A thin strip of material similar to that being heat treated is clamped between two electrodes within a Pyrex tube of the test strip. This becomes a resistor in a circuit in which temperature is controlled by a rheostat.



MORRISON stitcher, left, is followed by carpet-type air operated brake and flame impingement furnace.



DIRECT, GAS FIRED, special atmosphere forced circulation type furnace handles wire, rod and strip in coils to 28 in.

Good Welding Techniques Aid Repointing of Dipper Teeth

New techniques in repointing dipper teeth permit using smaller replacement tip, retaining more of original tooth. Result is saving of valuable manganese steel. Easily removable shovel point is pinned to adaptor base attached to bucket. Copper-molybdenum-manganese electrode works best.

A dipper tooth pointing method has been developed to save critical manganese steel castings and many manhours of labor. Costs are reduced 40 pct by this method, developed by Lincoln Electric Co. and Wallner Welding Supply Co., Duluth, Minn.

To meet the demand for Mesabi ore, work goes on all winter in preparation for the shipping season, removing the overburden so that all of the equipment possible can be used to handle ore when the Lakes open for shipping. As the shipping season runs about eight months, sufficient supplies of ore must be stockpiled at the steel mills to allow full production during the off-season.

This wintertime operation is extremely hard on the digging equipment as the material removed is generally more abrasive than the ore and because the Mesabi Range is located in a land of temperature extremes and experiences deep frost penetration.

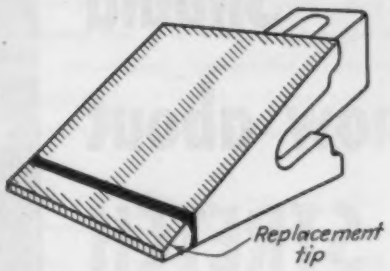
For ease in handling, a shovel point has been developed that is held by a pin to an adaptor base connected to the bucket itself. The point weighs about 40 lb and must be changed once every 8-hr shift, on the average. This changing operation can be quickly done and makes the use of this type point and adaptor more efficient than the old heavy one-piece tooth. It is important to keep the tooth sharp and up to size or wear will be taken on the more expensive, less replaceable parts back of the tooth.

A cast-to-length wedge bar of 12 to 14 pct manganese steel is used to replace the material worn away by the severe abrasion, after the tooth stub has been square trimmed by an oxy-acetylene cut. The wedge bar is tacked in place and the tooth is then welded completely on one side vertical up, one pass with the tooth positioned at 30 to 45° from the horizontal plane. The teeth are welded in group of five to allow some cooling between passes.

The welding is done with a copper-molybdenum manganese electrode. This electrode is ideally suited to the job because it has less cracking than nickel manganese electrodes when applied at the current values experience shows to be practical and a key to the success of the method. A 3/16 in. bare electrode is applied at currents in excess of 300 amp. Tooth breakage is about 2 pct, well under the 5 pct allowed and not greater than the breakage of new teeth.

After the wedge bar has been welded on, the edges or corners of the tooth are brought back to size using ¼ in. carbon-nickel-moly electrode and filler rod by the two-tone method.

The whole operation is greatly less costly than other procedures followed. The teeth are sized to keep the welding at a minimum and to throw away the least amount of material in the trimming operation. The tooth is kept up to size in all dimensions so that it takes as much wear as possible. Normal good welding practice is followed, with adequate spacing to allow fusion at the root of the weld.

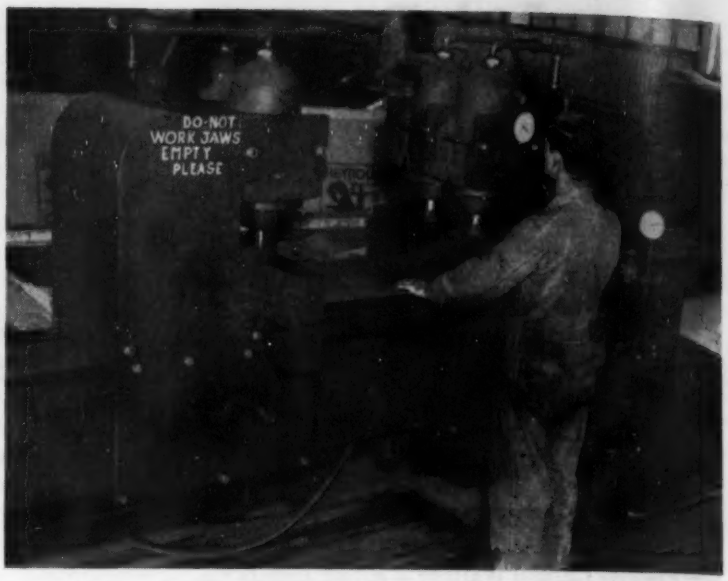


CAST manganese steel tip is welded on to dipper tooth with copper-molybdenum-manganese electrode. Shaded areas indicate where additional weld metal is deposited.

WELDING shop where dipper teeth are repointed by new welding method. Finished teeth show on floor outside booths.

No springback—

What you Should Know about STRETCH FORMING



EMBOSSED aluminum sheet being stretched to produce perfectly flat panels. Grip is 40 tons, stretching force 7 tons.

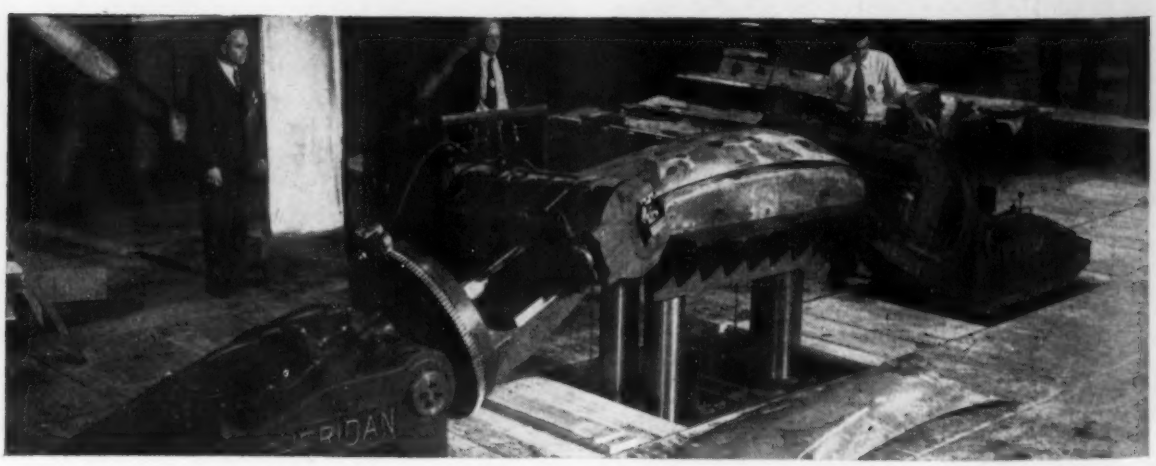
By E. V. Sharpnack
Chief Forming Engineer
Reynolds Metals Co.
Louisville, Ky.

Stretch forming is becoming increasingly popular for producing aluminum parts. Advantage: Springback is practically eliminated. Disadvantage: Ends of work are marred, must be scraped. Metal is stressed beyond elastic limit. Best materials for stretch forming are those with wide spread between yield strength and ultimate strength. Smooth and round sheet edges are needed. Form block surface should be polished, or blanket used.

Contour forming aluminum sheets, shapes, and tubing is readily accomplished by any of three principles: stretching, wiping, or rolling. A single machine may be equipped to perform one or all of these methods. Such machines are capable of forming circular parts and spirals, twisted parts, and parts requiring compound horizontal and vertical curves.

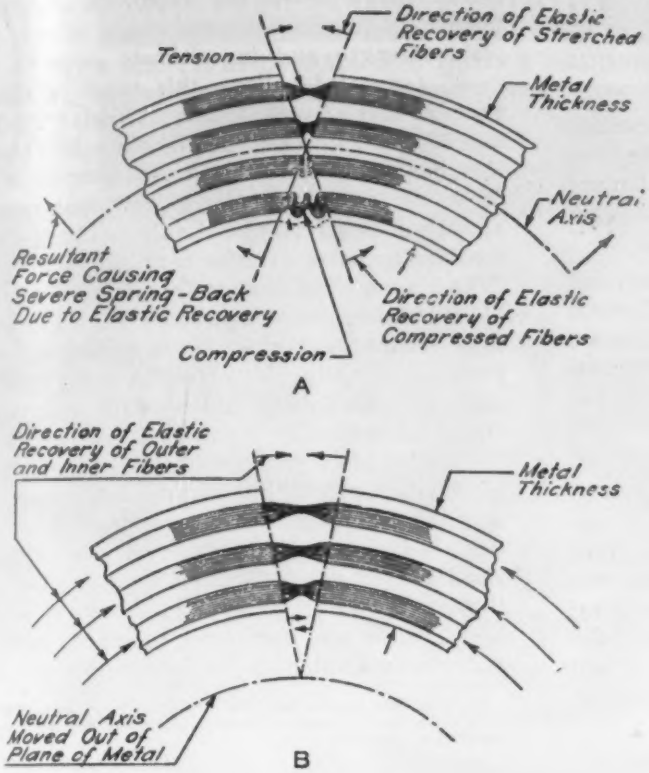
Certain parts can be formed entirely by stretching only. Others may have to be produced by the compression methods, using a shoe or rolls to wipe the shape against the forming block.

Stretch forming is popular for producing aluminum parts. The principle advantage is that springback is practically eliminated. All areas of the metal are stressed in tension beyond the



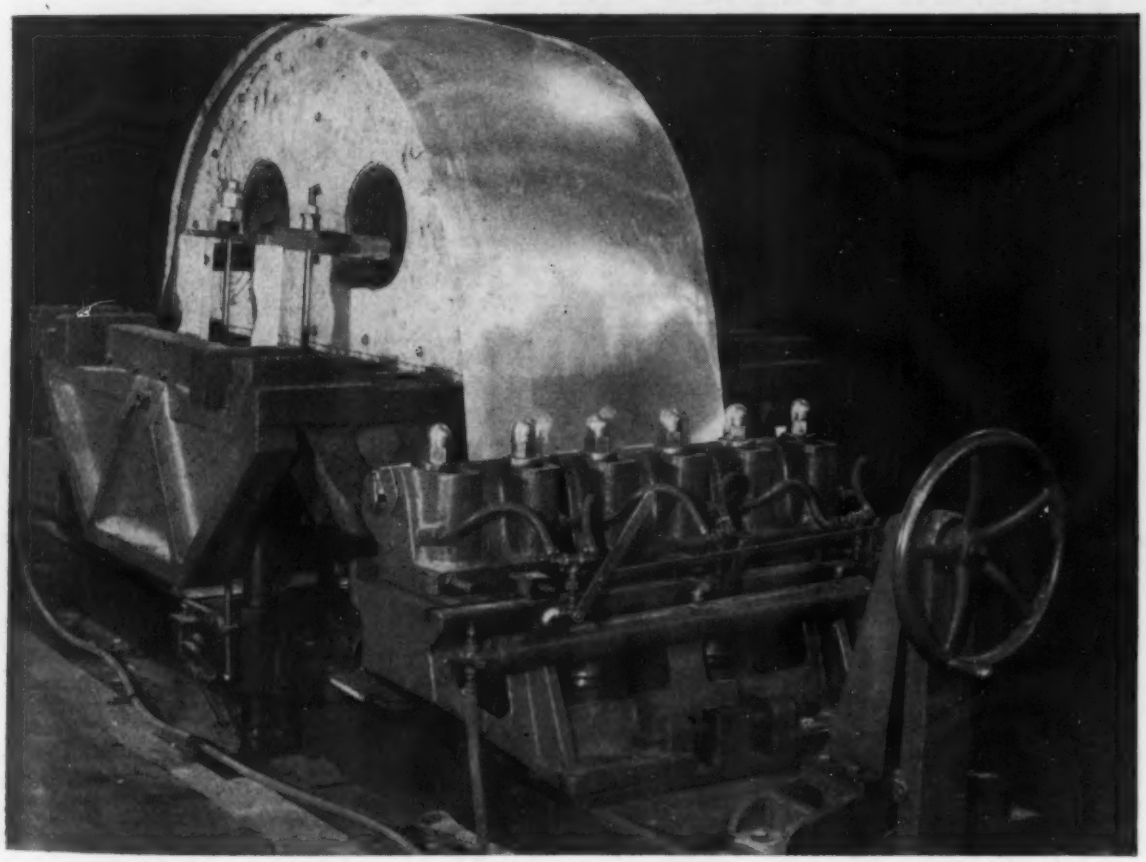
VERSATILE PRESS at Lockheed Aircraft stretch-forming nose section. End clamping devices are mounted on rotating heads. Slides in pit allow for horizontal movement of head assemblies. Springback is practically eliminated with stretch forming.

WHY THERE'S NO SPRINGBACK IN STRETCH FORMING


Direction of Elastic Recovery of Stretched Fibers
Tension
Metal Thickness
Neutral Axis
Resultant Force Causing Severe Spring-Back Due to Elastic Recovery
Direction of Elastic Recovery of Compressed Fibers
Compression
A
Direction of Elastic Recovery of Outer and Inner Fibers
Metal Thickness
Neutral Axis Moved Out of Plane of Metal
B

The upper diagram shows the effect of bending a sheet of metal. Metal above the neutral axis is in tension; that below it is in compression. This creates a couple, a combination of locked-in stresses tending to restore the original flat shape of the metal.

The lower diagram shows the effect of stretch forming. The neutral axis in this case is out of the plane of the metal entirely. Thus all of the metal is in tension. Therefore the direction of elastic recovery forces does not tend to restore the flat shape. This means virtually no springback.



MAIN elements of stretch forming operation are visible in this photograph. Jaws grip ends of work while a hydraulic ram lifts the form die in the center, stretching work over die. Dimensional changes in stretch forming must be considered.

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"Form Block should be designed so . . . metal will not protrude beyond its edges . . ."

elastic range. A disadvantage is that a certain amount of scrap loss is encountered. The ends of the workpiece are gripped in jaws which are usually serrated to provide a good hold. This marks the ends so they must be scrapped.

Allowances must be made for dimensional changes that occur in the part being formed. During stetching, the length of a part increases, and the width decreases as the cross-sectional area reduces. Allowances must be made for these changes in calculating proper widths of material before stretching and in any part of the tooling that may be affected.

In forming unsymmetrical parts such as angles, it is advisable to form in pairs so that forming forces will be more in balance. The form block should be designed so that the metal will not protrude beyond its edges unless very generous radii are provided. Sharp edges will restrict the stretch in local areas, resulting in fractures.

The important factor to remember in stretch forming is that the metal is stressed beyond its elastic range. Select the aluminum alloy and temper on the basis of the range between its yield strength and its ultimate strength. In "—0" (annealed) alloys, this range is rather wide, as it is in 61S-T4, 24S-T3, Alclad 24S-T3, and R301-T3. Material in —H12 or —H32 condition has about half the stretch properties of those above. Other tempered and heat-treated alloys can be stretched but only to a limited extent and by using extreme care.

As a precaution against fracturing and as an aid to obtaining maximum stretch, it is essential that sheared edges of sheet be burred and rounded. Any slight imperfection in the sheared edge will similate a notch effect, causing a stress concentration resulting in early failure.

Forming block surfaces should be highly polished and kept well lubricated. Light greases or drawing compounds are recommended. Sometimes a blanket of thin rubber or woven fibreglass is used on the forming block to eliminate the extra work and cost of lubricants. The use of a blanket also overcomes the necessity of a high surface finish on the forming block.

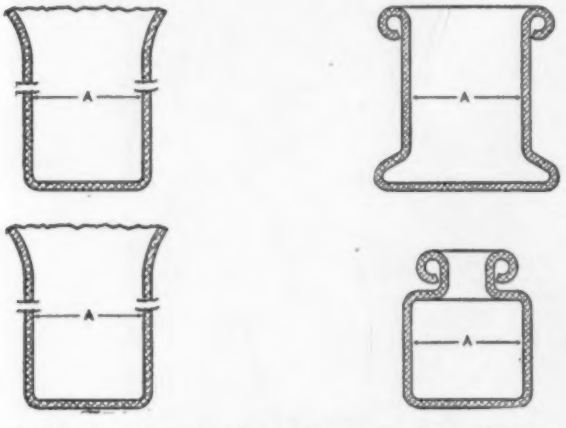
Ed. Note: This and the following article are based on part of the forthcoming book: Aluminum Forming, to be published by Reynolds Metals Co., Louisville 1, Ky.

Spin-draw Complex Metal Parts

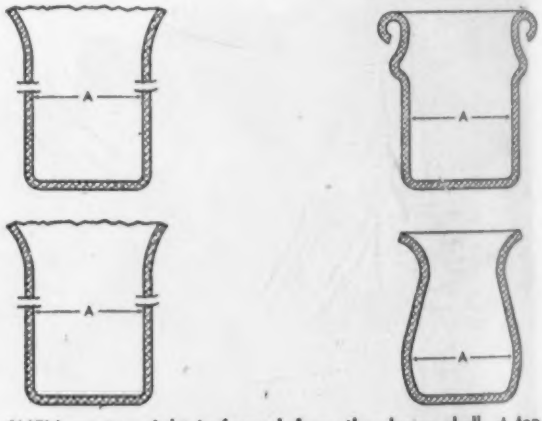
Spinning of aluminum is gaining in popularity because it permits production of many products difficult to make otherwise without elaborate tooling and more expensive equipment.

Generally, spinning is confined to relatively simple concentric parts such as reflectors, bowls and tank heads. But it can be used for more complex shapes, too. One growing use for spinning is its use as a complement to drawing.

Various shells requiring tapers, large radii, or wide flanges, cannot be drawn completely to final contour without encountering wrinkles, buckles, or fractures. These may be drawn to the point where such conditions are about to appear and then given their final shape by spinning.



BULGING, trimming, and beading convert drawn shell, top left, into finished shell at top right. Internal chuck and floating sleeve, external form roll tool, and spinning, trimming, and beading tools, are equipment used. Necking, trimming, and beading produce shell at bottom right from drawn shell, bottom left. Equipment includes spinning, trimming, and beading tools, hollow exterior and internal off-center chucks.



SHELL at top right is formed from the drawn shell at top left by rolling, trimming, and beading. Tools used include hollow exterior chuck, internal form roll, spinning tool, trimming tool, and beading tool. At bottom right is shape formed from drawn shell at bottom left, by using an interior sectional chuck along with the usual spinning tool and trimming tool. Diameter A is same before and after spinning.

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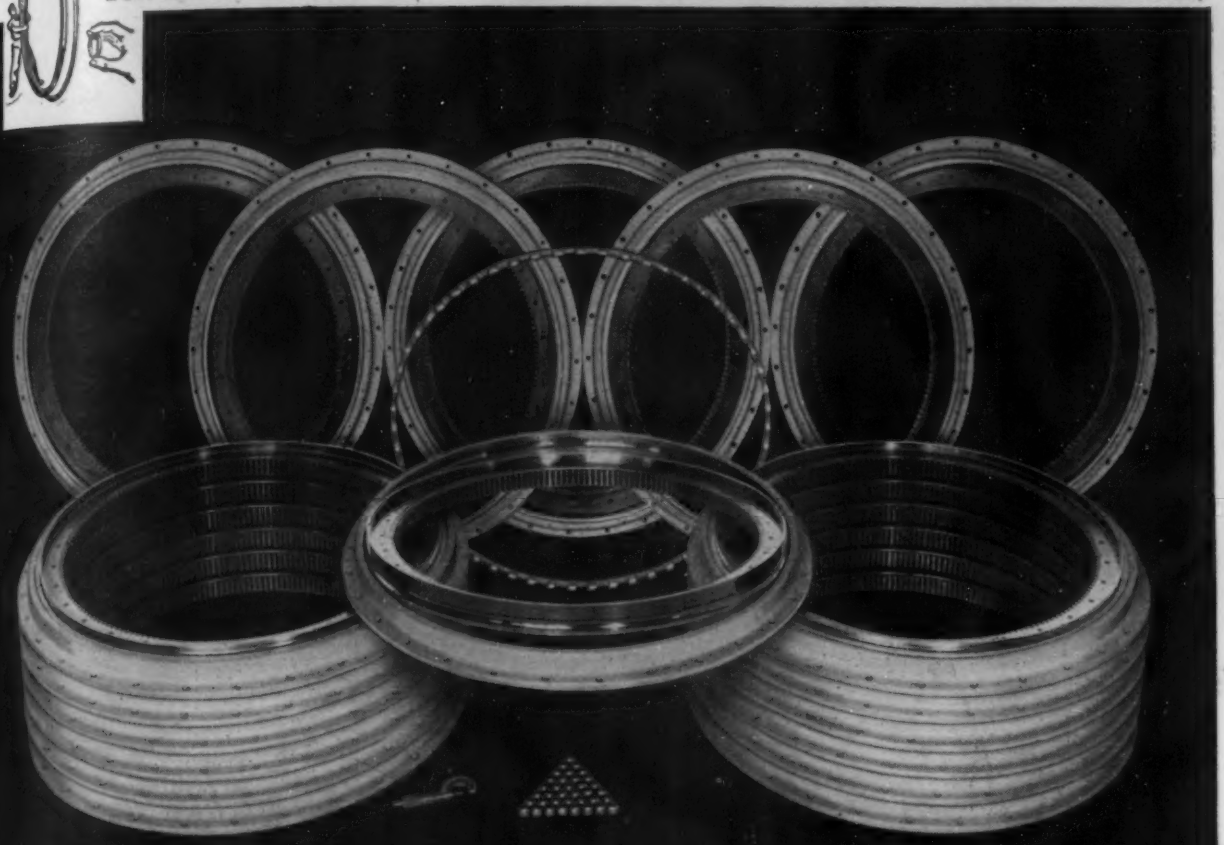

KAYDON 4-Point Angular Contact Ball Bearings 22.350" x 29.125" x 1.687"

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KAYDON flame-hardening has made possible many special bearings of unusual design, like the 4-point angular contact ball bearings shown here ...with outer and inner races flanged for mounting directly to adjoining machine structures ... with gear teeth cut right on inner race, and inner races fortified by special protective finishes.

KAYDON flame-hardening of bearing-raceways to unusual depths (without through-hardening the races themselves) permits races to be drilled, tapped and gear-cut . . . the bearing bulk and weight are greatly reduced . . . many surrounding parts may be eliminated . . . unusual shapes, very large diameters, extremely thin sections that facilitate mounting are achieved.

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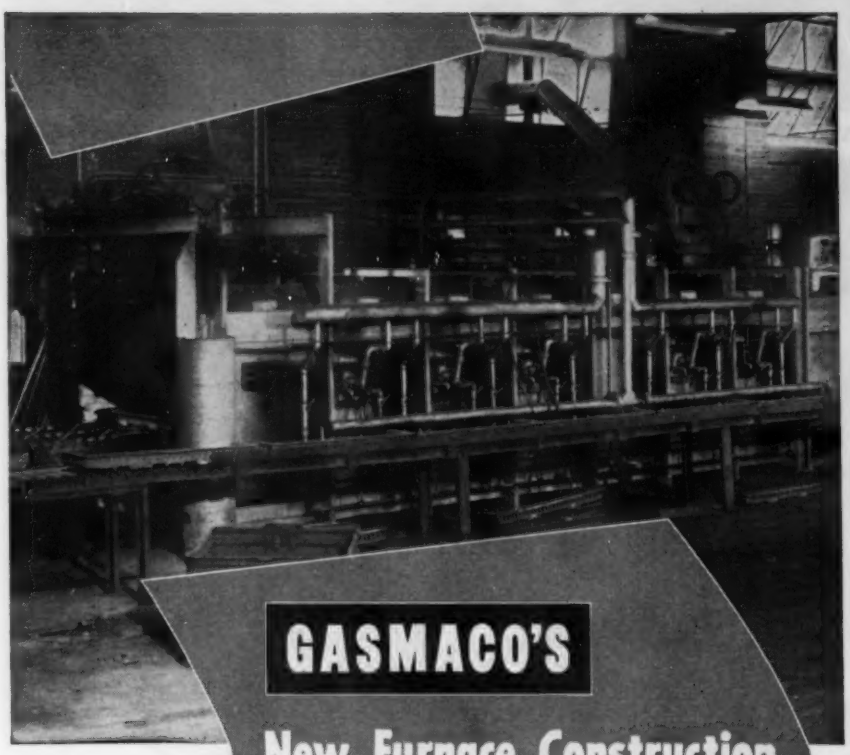

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ELIMINATES USE OF CRITICAL MATERIALS

Desirable savings in nickel and other critical materials can be accomplished through new methods in design and construction of industrial furnaces by The Gas Machinery Company.

Specifications for forging and heat treating can be met by employment of a rotary furnace, the construction of which requires only refractory and moderate quantities of carbon steel. Rotary furnaces require less investment for the same duty, and results are superior.

Other Gasmaco accomplishments include the use of silicon carbide in roller hearth furnaces, replacing alloy steel. For practically all applications where alloy steel tubes and rollers were formerly used, silicon carbide can be substituted, with greater benefit.

Our furnace engineers will be glad to point out the many advantages of Gasmaco developments and industrial heat applications which may fit your requirements.

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—Free Publications—

Continued

Stampings

Stampings in Small Lots is a new folder describing the HPL Fast Tooling service which permits rapid and inexpensive production of stamped parts for experimental work or other uses where quantity requirements range from 25 to 25,000 pieces. Typical shapes that can be made are shown in the bulletin. Relocation or resizing of holes and many other changes which ordinarily mean scrapping costly conventional dies can be accomplished quickly and economically with the HPL method. *HPL Manufacturing Co.*

For free copy circle No. 13 on postcard, p. 145

Rotary tables

Giddings & Lewis rotary tables for horizontal boring, drilling and milling machines are designed to simplify work settings, increase production and lower machining costs. The units come in plain, hand, combination and power feed models. They rotate and index work in horizontal, vertical and tilted positions. Information on these practical rotary tables is provided in a recently issued leaflet. *Giddings & Lewis Machine Tool Co.*

For free copy circle No. 14 on postcard, p. 145

Fasteners

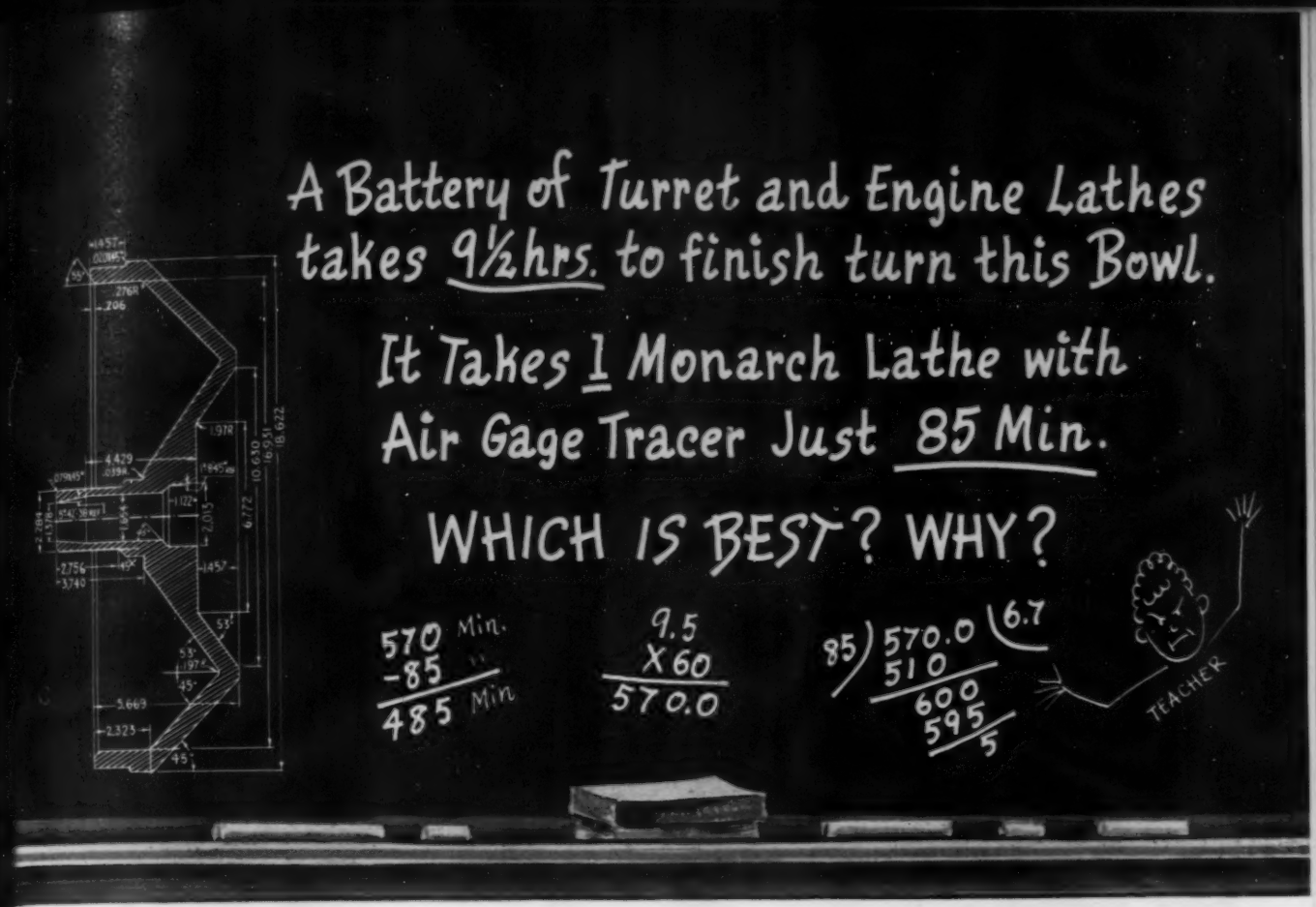
The new Southco handbook of fastening specialties contains 22-p. of information on industrial fasteners for metal to metal and metal to wood applications. Blind rivets and a variety of door latching and fastening devices are illustrated. The book also includes several pages of frequently used engineering data. *Southco Div., South Chester Corp.*

For free copy circle No. 15 on postcard, p. 145

Gear selection

Selecting Gears for Rolling Mill Equipment is a new 16-p. illustrated booklet which sheds a lot of light on the conditions influencing the selection and application of gear sets. *United Engineering & Foundry Co.*

For free copy circle No. 16 on postcard, p. 145



Simple Arithmetic!

STAINLESS STEEL CREAM SEPARATOR BOWL JOB REPORT

MATERIAL—Rough-turned stainless steel forging. EQUIPMENT—Monarch 25" Model N Heavy Duty Lathe with Swiveling Air Gage Tracer. OPERATIONS—1. Turn O.D. Turn hub and face to reverse taper (2-section template). 2. Change template—face rim and turn reverse taper (Figure A). 3. Turn work, change template—rough inside taper, finish turn complete, bore (Figure B). Same 2-section template used for all three cuts.

HOW DO YOU EFFECT SAVINGS LIKE THIS? With the Monarch "Air-Gage Tracer" PLUS, in this case, the exclusive swiveling design. For efficient cutting tool action on a wide range of planes during a continuous cut, there's nothing else like it. Even including work-handling time, floor to floor time of 85 minutes is easily maintained. This is due to the automatic accuracy of template contour duplication . . . ease of set-up . . . simplicity of tooling and tool change.

HAVE YOU TURNING OPERATIONS THAT YOU'D LIKE SIMPLIFIED? Monarch Lathes range from the 10" Model EE Precision Lathe to 32" Heavy Duty Turning Machines—most of which we can provide with any one of our *three* types of Tracer Controls. *You* know the kind of guts and accuracy we build into Monarch Lathes. Let us show you what they can do with Tracer Controls. Just detail your job . . . . *The Monarch Machine Tool Company, Sidney, Ohio.*

Monarch

ACCURACY • ECONOMY • LONG LIFE

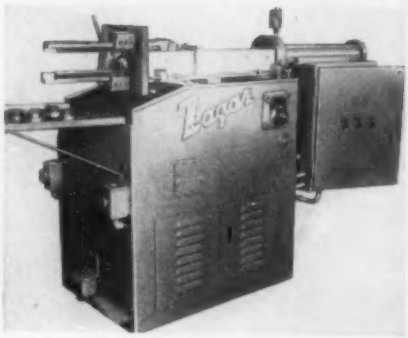
TURNING MACHINES

FOR A GOOD TURN FASTER...TURN TO MONARCH

UNIVERSITY OF MICHIGAN LIBRARIES

NEW equipment

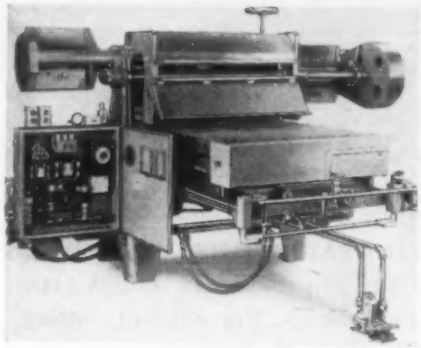
New and improved production ideas equipment, services and methods described here offer production economies . . . fill in and mail postcard on page 145 or 146.



High speed broach cycles at 700 strokes per hour

New Hyspeed 20-in. broaching machine is claimed to be one of the fastest horizontal broaching machines in point of operation and strokes per hour. Foot pedal for starting machine is double sided; machine can be operated on either side. It is hydraulically operated and electrically controlled through a system built to JIC standards. A selector switch determines automatic return stroke or conventional broaching stroke which stops at end of each cutting stroke. Coolant system pumps light or heavy cutting solvents at considerable volume. Maximum pull is 6000 lb; maximum feed stroke variable between 2 and 27 fpm. *Zagar Tool, Inc.*

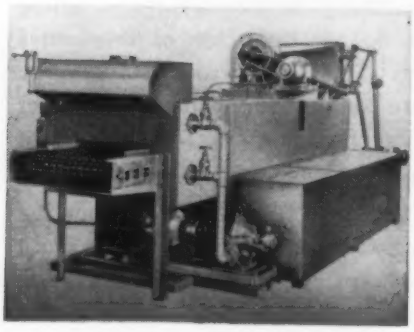
For more data circle No. 17 on postcard, p. 145



Machine surface finishes decorative name plates

Through a vacuum chuck arrangement, this improved surface finishing machine will handle name plates made of brass, copper, silver, plastic, aluminum, wood and other non-magnetic materials. Even small items can be held and surface finished without interference with coverage over the entire surface. All controls have been assembled at a central control panel, which is contained in a metal case. This is located where it is not exposed to abrasion from the polishing compound. Motors are available in varying speeds to 15 hp in size. Buffs used on this machine are 9 in. diam, can be increased to 12 in. diam. *Clair Mfg. Co., Inc.*

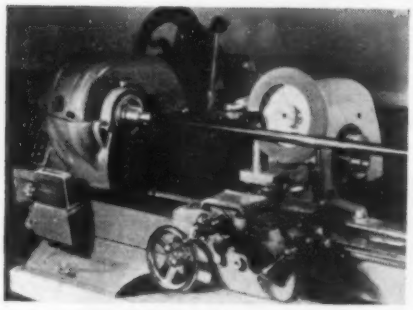
For more data circle No. 18 on postcard, p. 145



Washing machine spray-cleans rocker arm shafts

A special washing machine has been designed for removing grease and chips from rocker arm shafts after the machining operation in a large automobile manufacturing plant. A feature is the special type bar conveyer unit equipped with steel disks upon which the shafts ride. Disks not only hold the shafts in place as the conveyer moves through the machine but also provide minimum points of contact so the maximum surface of the shafts is exposed for fast, efficient washing and drying. Super-Spray cleaning system is utilized. *Alvey-Ferguson Co.*

For more data circle No. 19 on postcard, p. 145



Abrasion tester for cylindrical parts

A new abrasion testing machine rates the wear resistance of protective finishes, i.e. black oxidized or electroplated coatings, extruded plastic and enamel applied to cylindrical parts or test pieces. Tester is adjustable to take cylindrical specimens from ½ to 6 in. diam and 8 to 36 in. long. Width of the wear track is normally 1 in.; can be ½ in. wide where required. Abrasion resistance is reported as the number of wear cycles the surface will withstand before penetration of the protective finish permits corrosion to take place. *Taber Instrument Corp.*

For more data circle No. 20 on postcard, p. 145

Turn Page

How to make friends

of your customers' plant engineers....

good judgment calls for

PARKER-KALON®

when good design calls for

SOCKET SCREWS

DELIVERIES ARE BETTER CHECK WITH P-K FIRST

Your P-K DISTRIBUTOR *has good news. His stocks of P-K Screws are steadily improving. The size and type you need may now be readily available. Ask him about it. Remember— "If it's P-K . . . it's O.K."*

The opinion of your customers' plant engineers and maintenance crews carries a lot of weight when the time comes to order additional equipment.

You can make friends for your product by assembling it with P-K Size-marked Socket Head Cap Screws. Each screw has the size clearly incised on the head. It's easy to tell which screw goes where.

Saves you time in product assembly, too. Sizes are issued correctly, used correctly. There's no time lost checking and changing, no spoiled work. It puts screws back in use that might otherwise be wasted because sorting is "too much bother".

Since there are no better quality Socket Screws available at any price, why not give your product the plus of the exclusive P-K Size-marked Gear Grip features? Ask for samples. Parker-Kalon Corporation, 200 Varick Street, New York 14.

SIZE-MARKED SOCKET HEAD CAP SCREWS • GROUND THREAD SOCKET SET SCREWS • FLAT HEAD SOCKET CAP SCREWS • STRIPPER BOLTS • PIPE PLUGS • HEX KEYS

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48-in. rotary table simplifies setup of work

The giant size Rotab is designed for holding work during machining or checking radial or angular operations and is especially adapted for boring mill applications. A motor located under the table and hooked up to it by direct drive, controlled by a pushbutton, rotates the 48-in. diam table at 5 rpm (or to specifications) and simplifies work setup. A handwheel is used to complete the setting to precision accuracy within 2 min by vernier graduations found on a scale just under the table. Face plate can be rotated to any degree, can be adjusted to any angle from the vertical to the horizontal position, and to 30° below the horizontal the opposite way. It can be locked in position. Surface of the plate is divided by 8 T slots 11/16 in. wide running to the outer rim to provide clamping facilities. Machine is provided with centering plug and 10-in. sine bar. *Machine Products Corp.*

For more data circle No. 21 on postcard, p. 145

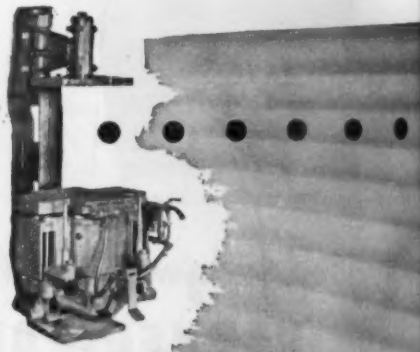
Load carriers handle large bulky loads

New extra-heavy-duty load carriers in capacities up to 36,000 lb are designed to handle large, bulky industrial loads such as crated machinery from assembly and crating areas to shipping docks and railroad sidings. Loads are placed on the truck and removed by fork trucks or cranes. Truck features four-wheel power steering for ease of operation and maneuverability. Where extra-large loads are handled, the driver can drive the truck backwards for better visibility. *Yale & Towne Mfg. Co.*

For more data circle No. 22 on postcard, p. 145

FROM THE SMALLEST

There's a SPO for every job!



From the smallest to the world's largest jolt-squeeze-stripper, **SPO** has a model to meet every foundry production need. **SPO** molding machines range from small, portable, manually operated units to fully automatic, push-button giants.

Regardless of its size, each **SPO** molding machine is built for safe, dependable operation and maximum accuracy. Many feature the patented "inverted jolt" mechanism which assures extremely long service life with minimum maintenance. All incorporate **SPO** air vibrators which are known for their sturdy construction and operating efficiency.

Whatever your production schedule, **SPO** builds a molding machine to meet your requirements. To obtain the finest foundry equipment available today, **SPECIFY SPO . . . *the world's largest supplier of molding machines.***

Write today for Bulletin No. 2000 for complete data.

SPO INCORPORATED

613-SI

Drawing, forming press has two pressure cycles

This 300-ton hydraulic press was built for making plow beams, and has a special hydraulic circuit with two pressure cycles in one. Operation is by remote electrical control. There are two foot switches. Ram is made to exert a low tonnage by activating one foot switch, and a high tonnage by activating the other foot switch. The plow beams are bent to a specific angle at low tonnage, and are then turned for flattening and high tonnage. Press is arranged for pressure reversal and position reversal. Within convenient reach of the operator a simple crank handle for operation of limit-switch controls is located at the left. At the right an inching-down handwheel permits operator to move the platen down as little as 1/16 in. at a time. This aids precise control in die-setting. A safety feature is thermostat in the reservoir which will automatically stop press operation if the oil should reach a critical temperature. *American Steel Foundries, Elmes Engineering Div.*

For more data circle No. 23 on postcard, p. 145

Small shop welder has 20 to 180 amp range

Limited type input welder, with a high open circuit voltage of 65 v, boasts a welding range of 20 to 180 amp, making it suitable for welding thin fender metal on up to repair-welding of such heavy steel as tractor hitches. The welder has Dial-Lectric control; three-quarter turn of the knob provides continuous heat control from minimum to maximum capacity. Machine has high range for general purpose welding, and low range for light gage welding. *Harnischfeger Corp.*

For more data circle No. 24 on postcard, p. 145

Turn Page

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Specialists in Industrial Cleaning Products

After 432 hours in salt spray, corrosion has just begun on PRE-FOS-processed steel.

"Phosphating cleaner consumption cut 25%!"

—PRE-FOS field report

And here are more field reports:

"We can run one to two weeks longer before dumping!" "Humidity cabinet resistance improved 80%!" "Best cleaning our washer has ever produced!"

Everywhere users are hailing the unchallenged superiority of Wyandotte PRE-FOS*, the sensational *new* phosphating cleaner that cleans; deposits a fine-grained phosphate coating—an ideal paint base; and prevents rust of in-process steel parts.

PRE-FOS performs in hard or soft water, can be used in spray washer or soak tank and has long solution life. It rinses freely and completely; does not corrode mild steel equipment; reduces sludging.

Read the comparative tests on PRE-FOS and four competitive products, below. Then investigate this great, new cleaner! And be sure to write us for help with *any* of your cleaning problems. We'll be happy to serve you. *Wyandotte Chemicals Corporation, Wyandotte, Michigan; also Los Angeles 54, California.*

CLEANING THE WORLD

*Reg. U. S. Pat. Off.

Product	Hours to failure in salt spray Panels spray processed 3 minutes, 2 oz./gal., 35 lbs./sq. in. pressure, 160°F. Finished with appliance white enamel and baked; paint thickness 0.0007 inches.	Spray washer cleaning rating 2 oz./gal., 25 lbs./sq. in. pressure, 160° F., drawing compound and heavy oil soils.	Soak cleaning rating 4 oz./gal., 170° F., no agitation, mixed and mineral oil soils, 10-minute immersion.
A	failed—408 hours	fair	fair
B	failed—120 hours	fair	fair
C	failed—192 hours	good	good
D	failed—240 hours	poor	poor
Pre-Fos	no failure—420 hours	excellent	excellent

THE WYANDOTTE LINE—products for burnishing and burring, vat, electro, steam gun, washing machine and emulsion cleaning, paint stripping, acid pickling, related surface treatments and spray-booth compounds. An all-purpose floor absorbent: Zorball. In fact, specialized products for every cleaning need.

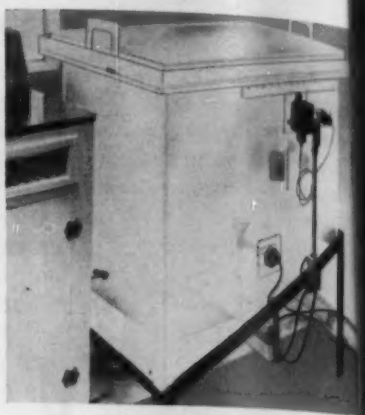
Largest manufacturers of specialized cleaning products for business and industry

Wyandotte CHEMICALS

Helpful service representatives in 88 cities in the U.S. and Canada

—New Equipment—

Continued



Lucite testing cabinet

H-T Lucite salt spray testing cabinet for fog-type spray testing of ferrous and nonferrous metals, organic and inorganic coatings will last indefinitely in continuous service. Primarily designed for salt spray testing, the cabinet is said to be inert to all solutions and gases used in the complete range of fog-type testing. The all-welded Lucite unit offers versatility, is lightweight for portability, transparent for observing operations, and insulated to maintain accurate operating temperatures. Standard cabinet is shipped complete and ready to use. *Singleton Co.*

For more data circle No. 25 on postcard, p. 145

Precleaner for steel

A compound, Detrex 61, precleans steel that is to be deep drawn or extruded. Used in a soak tank at approximately 190°F at a concentration from 6 to 10 oz per gal, it completely removes oil, grease and dirt from all ferrous parts. *Detrex Corp.*

For more data circle No. 26 on postcard, p. 145

Tubing harness

Corrosion proof instrument tubing harness is composed of a bundle of polyethylene tubes over which is extruded a 1/16 in. sheath of black polyethylene plastic of high molecular weight. Standard Impervapak Poly-Cor is supplied with 4, 7, 10, 14, or 19 tubes of ¼ in. OD having a ⅛-in. bore. Individual tubes are color coded for easy instrument line identification. *Samuel Moore & Co.*

For more data circle No. 27 on postcard, p. 145

Stroboscope unit

The Berkshire Labstrobe, Model 18, is a small, light, inexpensive stroboscope unit, giving 60 brief flashes of light per second when connected to 60 cycle ac power line. The lamp is a standard neon bulb. The instrument is useful for determining the speeds of rotation of motors, machines. It is housed in a chrome plated case, the size of a standard two-cell flashlight. *Berkshire Laboratories.*

For more data circle No. 28 on postcard, p. 145

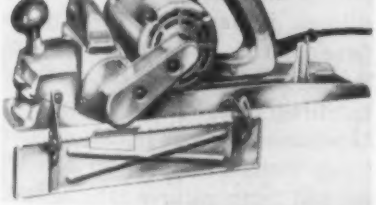
Bench vibrator

Redesigned Vise-Grip air vibrator finds ready applications in industries where bench type vibration of "stuck" materials is practical. The vibrator is easily installed on a bench with simple faceplate and bolts. Sturdy, steel U-shaped head functions as a vise to clamp the form or device to be vibrated. Serrated steel plate in the head assures positive bite and rigid mounting. *Cleveland Vibrator Co.*

For more data circle No. 29 on postcard, p. 145

Combination plane

Portable electric plane said to be efficient on both flat surface and edge planing has full 3-in. width of cut and a depth of cut capacity of ⅛ in. A lever controls the depth of cut with accurate graduations at each 1/64 in. Special chip deflector keeps work area free of chips



and may be directed to right or left as desired. Cutter head travels at an ultra high speed of 13,500 rpm, producing a smooth, ripple-free surface that normally requires no sanding. Plane has an aluminum alloy housing and complete ball bearing construction throughout. *Skilsaw, Inc.*

For more data circle No. 30 on postcard, p. 145

Turn Page

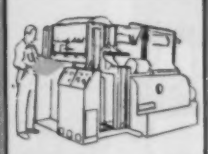
THE FOUNDRYMEN'S THEATRE
NOW FEATURING
SHELLMOLDING
A PREMIERE IN METAL-WORKING TECHNOLOGY

The Shell Molding Process . . . major, recent technological advancements in the foundry industry.
— FOUNDRY • June 1952

Unveiling Secrets of Shell Molding . . . At the touch of a button, this machine automatically forms . . . both halves of a shell mold.
BUSINESS WEEK July 5, 1952

Look, no back-up — SHELL-MOLDED Stainless Valves and Fittings Now in Production . . . increase in metal yield . . . smoother finish . . . cleaner working conditions . . .
— The IRON AGE June 26, 1952

SEE OUR TYPE SU-1 SHELLMOLDING UNIT



WHAT IS ALL THIS HULLABALOO ABOUT SHELLMOLDING?

In spearheading the industrial application of this process, we've been preoccupied with refining our basic techniques and perfecting the automatic machinery which, together, have established the economic feasibility of shellmolding. May we, at this point, therefore, add a few remarks of our own to the general chorus on the subject?

Shellmolding has proved itself, in important segments of the American metal-working industry, to be a successful means toward an end. That end is *the casting of metal more economically* and at that, with a smoother finish, to closer tolerances, and of greater complexity than is possible by traditional sand-casting methods.

These objectives can not be achieved just by going out and ordering a molding machine that may — or may not — be suitable for turning out the size and shape and number of molds you need to meet these requirements. There's a lot more to the production of competitively saleable shellmolded castings than that.

Simple as it looks, simple as it sounds, it takes a tremendous amount of engineering know-how — of the kind that can be independently acquired, starting from scratch, only by years of research and experimentation, and that is otherwise available only from those who already have behind them . . . *proven records of successful experience*

— developing the basic process itself

— engineering and constructing machinery and auxiliary equipment *around that process*

— designing and building patterns specifically for use in that process, and

— producing shellcastings under actual operating conditions *at a saving to the foundry.*

ALL IN A MOLDSHELL

We suggest that you get the machinery, the tools, and the engineering-background know-how you need. So far as we know, you can get it, guaranteed on a performance basis, only from—

SHELLMOLD & MACHINE CO., INC.
70 PINE STREET, NEW YORK 5, N. Y.
911

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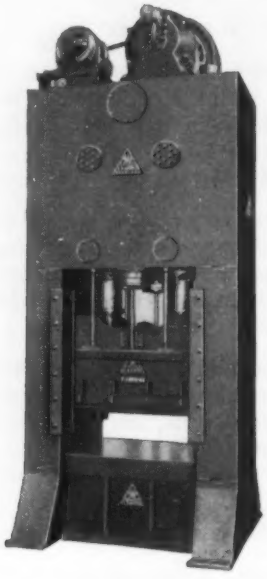
"streamlined" is the word for Alice

She's just a white-collar girl—an office secretary—but if you're an American manufacturer you'd better keep an eye on Alice Porter.

Whether your product is used in the office or the home, the nod of her blonde head controls your cash register.

Typewriters, files, vanity cases or pots and pans—Alice likes 'em streamlined. That means smooth, light in weight, strong without bulk. And *that* means (although Alice doesn't know it) produced on presses.



Up-to-date press methods cater to popular demands and reduce costs at the same time. Was there ever a better formula for expanding a market? It's no secret—your competitors know it, too. Get in touch with us to see how your product can be improved, and production costs cut, with one or more Clearing presses.

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HAMILTON DIVISION, HAMILTON, OHIO

CLEARING PRESSES

CMC CLEARING

THE WAY TO EFFICIENT MASS PRODUCTION

—New Equipment—

Continued

Optical level

For measuring flatness, straightness and parallelism a new optical level reads deviations from the horizontal of 0.00012 ipf of length or 0.00001 ipi of length. The system consists of three bubble phials and two prisms so arranged that twice the usual accuracy of level reading is obtained. The amount and value of deviation from the true horizontal in the workpiece being examined are measured by means of a large diameter, graduated micrometer thimble and barrel with easily read figures and markings. *F. T. Griswold Mfg. Co.*

For more data circle No. 31 on postcard, p. 145

Rigid plastic pipe

Improved type L pipe features greater tensile and flexural strengths, resistance to sunlight and longer life expectancy. A new compression type coupling incorporates a radically different design. Lightweight, ease of handling and resistance to rot, rust and electrolytic corrosion are other features. The pipe is supplied in 10 and 20 ft random lengths, standard sizes ½ to 2 in. Threaded adapters facilitate connection of plastic pipe with previously installed metallic piping systems. *Carlon Products Corp.*

For more data circle No. 32 on postcard, p. 145

Solves flow problems

Accurate measurement of flow of liquids and gas under difficult conditions is made possible by the development of a new, improved flowmeter. The unit is capable of handling toxic or highly corrosive substances, viscous liquids or other fluids under pressures up to 20,000 psi and temperatures ranging from –269°C to 1200°F. All parts except the sensing element are encased in a Brown ElectroniK potentiometer. Instrument is known as the Potter-Brown flowmeter. Can be used for laboratory work and for industrial flow and automatic control applications. *Minneapolis-Honeywell Regulator Co.*

For more data circle No. 33 on postcard, p. 145

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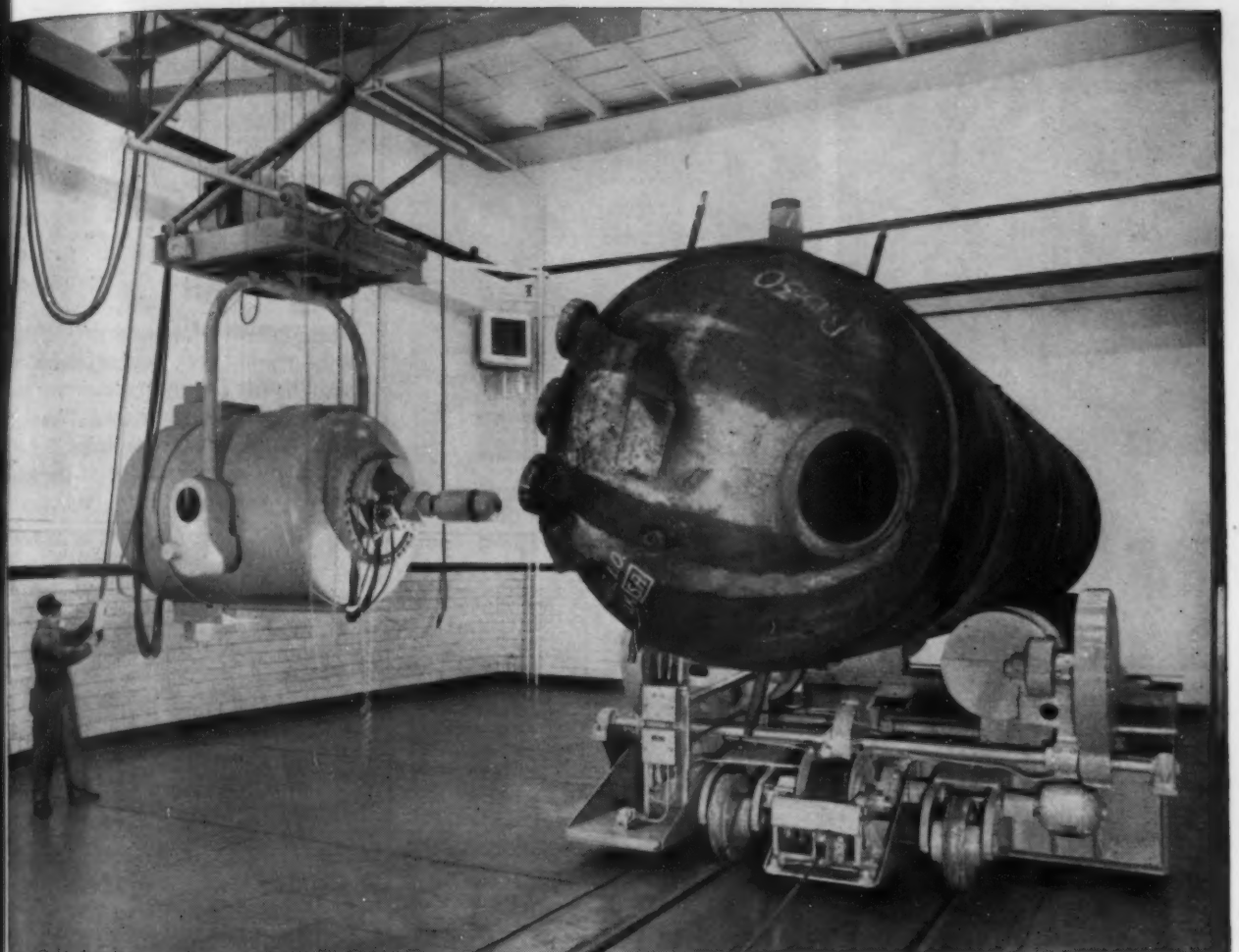
This x-ray unit cuts time per radiograph

FROM 8 HOURS TO 6 MINUTES



Fast, low-cost inspection of pressure vessels results from the greater penetrating power of the GE Resotron 2000 (2,000,000-volt) x-ray unit.

Only General Electric offers a complete line of apparatus for high-voltage radiography

The success of General Electric high-voltage apparatus is based on more than its ability to cut costs and increase production. It's based on the built-in dependability and long life of each individual piece of equipment. Your assurance of day-in-day-out low-cost operation.

It's also based on a *complete* line of equipment. No matter what your inspection requirements may be, General Electric can give you the *one* unit that does the job *best* . . . at the lowest cost.

And, finally, it's based on the nation-wide General Electric service organization. Each man is factory-trained and equipped to keep your installation at top efficiency.

These are facts. Facts you will want to know before purchasing x-ray equipment for your plant. For full information, write X-Ray Department, General Electric Company, Milwaukee 14, Wisconsin, Room AR-8.

You can put your confidence in

GENERAL ELECTRIC

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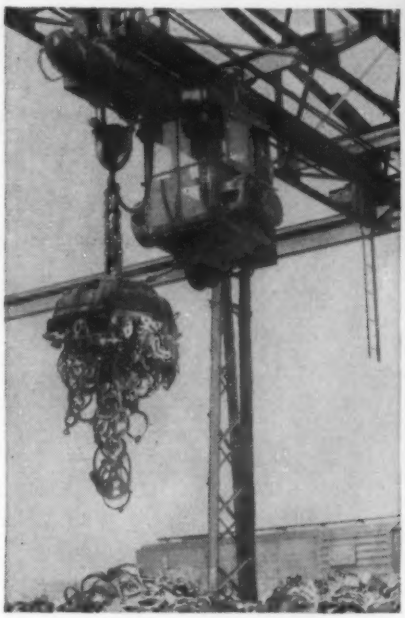
which one is right for your job?

FLOOR-OPERATED HOIST

Operator mainly occupied with other duties.



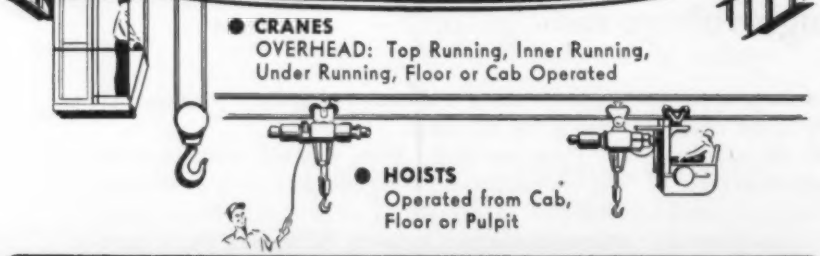
CAB-OPERATED HOIST

Operator in cab moves loads along at high speeds—occupies best vantage point for spotting or stacking.

Choosing the hoist that's right for your job calls for expert advice.

Let the Shepard Niles representative in your area guide you in your choice. He specializes in through-the-air handling — can help you select the hoist that fits your job. Write Shepard Niles today for Bulletins 127 and 177 — and ask to have a representative call.

Specialists in loads through-the-air since 1903


● CRANES
OVERHEAD: Top Running, Inner Running, Under Running, Floor or Cab Operated
● HOISTS
Operated from Cab, Floor or Pulpit

SHEPARD NILES
CRANE AND HOIST CORPORATION

1420 SCHUYLER AVENUE • MONTOUR FALLS, N. Y.

—New Equipment—

Continued

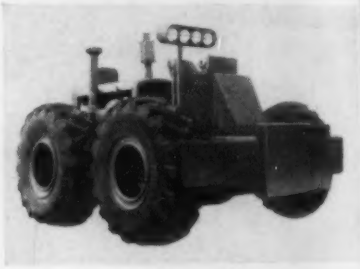
Flooring coating

Concrete floors can be protected against corrosion due to acid and alkali conditions by applying Lankote 700 series coatings. These plastic coatings are resistant to water, strong soap solutions, gasoline, etc., and can be easily applied by brush or spray. Has good resistance to constant abrasion, hard wear and shock. Twelve stock colors available. *Lankote Div., J. Landau Co.*

For more data circle No. 34 on postcard, p. 145

Pusher unit

New version of the Super C Tournadozer is the Tournatractor, a pusher unit for contractors who are using dozers as pushers. The new machine has a massive billet, 3 x 15 in., spanning the width of the machine. On the billet is a large



pusher plate. Tournatractor can be equipped with torque converter; is equally adaptable to pulling operations. Billet and pusher plate can be removed and A-frame power control unit and dozer added. *R. G. LeTourneau, Inc.*

For more data circle No. 35 on postcard, p. 145

Air line filters

For removal of corrosive moisture, abrasive pipe scale and other foreign matter from ¾ and 1-in. compressed air lines, new filters with replaceable transparent bowls are for use on air flows of 0 to 140 cfm at pressures of 0 to 150 psi and temperatures between 40 and 120°F. The bowl holds 1 pt below the baffle, enabling one to see when to drain—done by opening the drain cock. Filter is fully automatic and requires no adjustments. *C. A. Norgren Co.*

For more data circle No. 36 on postcard, p. 145

Bender for heavy jobs

One-inch diameter cold finished steel bar and 1¼ in. tubing, or their equivalents, can be formed in the new DiAcro bender No. 4. It offers a radius bending range from 0 to 12 in. A feature is a built-in ratchet mechanism. Engaging the ratchet mechanism increases the material capacity of the bender and multiplies the operator's effort by approximately four times. By disengaging the ratchet, operating the bender in direct drive, the operator can step up production of lighter materials. *O'Neil - Irwin Mfg. Co.*

For more data circle No. 37 on postcard, p. 145

Drum head cutter

New speedy, lightweight, hand operated head cutter is designed to cut out the tops of heads of one-time-shipper drums and cans of 24 to 30 gage metal. After the cut is completed the container will have a safe, turned-in flange which permits its use for many purposes. *Michael A. Schinker Mfg. Co.*

For more data circle No. 38 on postcard, p. 145

Self-forming packing

Steamfitters' special self-forming packing speeds up the job, reduces packing costs. Self-forming, self-lubricating and leak proof, this packing in handy rope style forms itself into a seal of the exact size and shape of the stuffing box or fitting into which it is placed. Only one size is made or needed. Available in ½ and 2½-lb spools. *Flexrock Co.*

For more data circle No. 39 on postcard, p. 145

Turn Page

CARS, CLIPS,

CANISTERS

&

CONTINUOUS

FEEDING

FOLLANSBEE COLD ROLLED STRIP is widely used wherever high-speed automatic machines turn out products in great numbers. Continuous feeding from coils is essential to maintaining volume like this. That's why Follansbee Cold Rolled Strip is furnished in continuous coils that keep automatics in action for real productioneering teamwork.

Follansbee Cold Rolled Strip Steel is manufactured to specifications, in tempers and finishes for most industrial applications. Let the nearby Follansbee Representative tell you about Follansbee Steel Service, tailored to fit *your needs.*

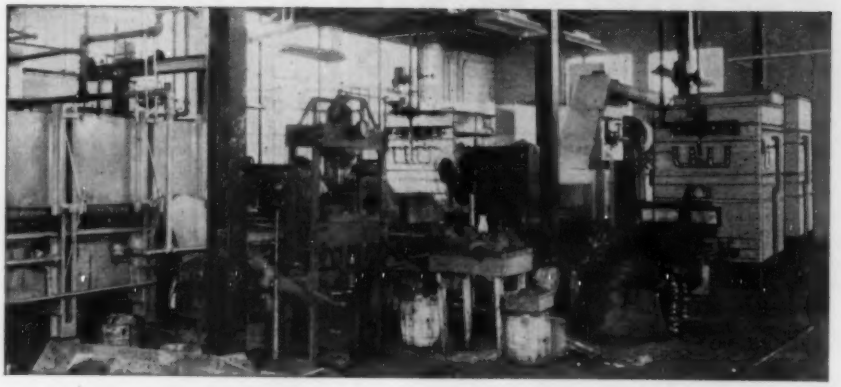
FOLLANSBEE STEEL CORPORATION

GENERAL OFFICES, PITTSBURGH 30, PA.

SEAMLESS TERNE ROLL ROOFING • COLD ROLLED STRIP
POLISHED BLUE SHEETS AND COILS

Sales Offices—New York, Philadelphia, Rochester, Cleveland, Detroit, Milwaukee. *Sales Agents*—Chicago, Indianapolis, Kansas City, Nashville, Los Angeles, San Francisco, Seattle; Toronto and Montreal, Canada. *Mills*—Follansbee, W. Va.

Follansbee Metal Warehouses—Pittsburgh, Pa., Rochester, N. Y., and Fairfield, Conn.



Niagara Aero Heat Exchanger quickly pulls down the initial peak load of heat in quenching . . . and saves cooling water

Accurate control of quench bath temperatures and quickly effective capacity to handle the initial peak load of heat in quenching prevents production set-backs, increases the output of your heat treating department, prevents oil fires, saves you losses from rejected parts.

Niagara Aero Heat Exchangers give you this control in both furnace and induction hardening methods. They prevent both over-heating and over-cooling of the quench bath. Hundreds of heat treaters know they prevent many troubles, constantly improve quality and increase production.

They quickly pay for themselves by saving cooling water coils and extend your quench capacity without extra water or cooling tower.

Write for Bulletin #120 giving complete information.

NIAGARA BLOWER COMPANY

Over 35 Years' Service in Industrial Air Engineering

Dept. IA, 405 Lexington Ave. **New York 17, N. Y.**

Experienced District Engineers in all Principal Cities of U. S. and Canada

—New Equipment—

Continued

Chrome-carbide blocks

Gage blocks made of chrome-carbide have carbide hardness and the same coefficient of expansion as steel so that it is not necessary to make corrections when checking steel parts. Surface finish is said to be superior, resulting in longer wearing blocks. DC blocks are offered in A and B grade accuracy in four sets of 83, 37, 35 and 8 pieces, covering size range from 0.010 to 20 in. *DoAll Co.*

For more data circle No. 40 on postcard, p. 145

Gold-colored paint

New gold-colored extra high heat resistant paint known as Heat-Rem XG-170 Gold is made of copper flakes in a silicone base. The paint will withstand temperatures up to 1700°F, according to the manufacturer, and will air dry in approximately 30 min. It prevents rust and is resistant to corrosion from mild acids, alkalies and industrial fumes. *Speco, Inc.*

For more data circle No. 41 on postcard, p. 145

Battery status

New battery charge indicator for industrial trucks can be mounted so that the operator can see the dial at all times, giving him instantaneous readings of the state of battery charge while his truck is operating. Easy-to-read dial indicates whether the battery is full, ½, empty, or in danger. *Gould-National Batteries, Inc.*

For more data circle No. 42 on postcard, p. 145

Safe cord sets

Interlocking receptacle permits use of cord sets for hazardous locations. It incorporates a sealed mercury switch that de-energizes each socket before a plug may be inserted or removed. This eliminates all danger of sparking. Mercury switch works on a cam lever which locks cord set caps in position after they are inserted. In locked position the switch completes the circuit. *Tigerman Engineering Co.*

For more data circle No. 43 on postcard, p. 145

SLITTING:

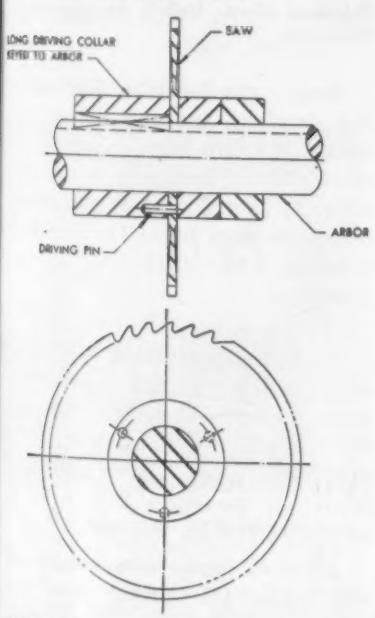
Pin drive cuts breakage of saws used on milling machines.

Breakage of large diameter slitting saws when used on milling machines can be cut through use of better driving methods, according to an engineering bulletin of National Twist Drill & Tool Co.

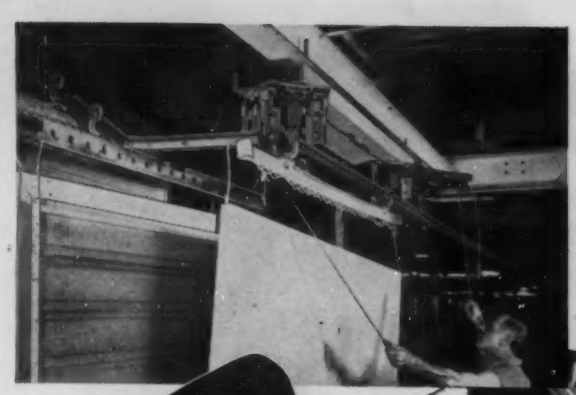
Arbor driving keys of slitting saws are located at the narrow section of the saw. Large leverage applied on the saw at the teeth imposes a high unit load on the driving key, causing it to shear.

Other Methods — To overcome this condition, total cutting load should be distributed over a larger area of the driving key. Most common method is to put several keyways in the saw and a corresponding number of keys in the arbor. Objection to this method is that the spacing of keyways and keys must be very accurate to properly distribute the load.

Another effective method provides a long driving collar, properly keyed to the arbor. This driving collar has several driving pins, meshing in corresponding driving holes in the saw. Driving pins are located at some distance from the center of the arbor (see drawing), thus providing a more favorable driving leverage.



PIN DRIVE used with slitting saws on milling machines provides more favorable leverage, reduce breakage resulting from sheared arbor driving keys.



Carriers roll off power conveyor in finishing oven to crosstrack switches for 90° transfer to shipping area.

Carriers descend through degreasing tank on power-operated chain conveyor

Solenoid operated switch automatically brings trolleys on parallel tracks into single track alignment.

A well-known metal partition manufacturer faced the problem of increasing production without enlarging building. New and better handling methods were obviously needed. They chose an American MonoRail overhead handling system as the best answer to increase capacity without increasing space and with less handling labor. Now, this American MonoRail system handles the steel components from receipt of raw materials, through finishing to shipping. The system boosted production, cut handling labor, improved space utilization, reduced material damage, bettered working conditions, and improved production control.

Let an American MonoRail engineer show you how it can be done in your plant.

THE AMERICAN MONORAIL COMPANY

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Directors' Meeting ...THE MORNING AFTER

In the middle of the night fire hit this plant with sudden, blasting fury. Started in oil storage and spread like lightning. Next morning the directors could rightfully ask, "*Where was our fire protection?*"

Unfortunately, it lay in a desk drawer—a proposal for a fire extinguishing system that would have made oil storage and half a dozen other equally bad hazards fire-safe. Procrastination pigeonholed protection . . . and disaster didn't wait!

In *most* plants there are critical hazards for which generalized fire protection may be hopelessly inadequate. It was for just such "hot spots" that CARDOX years ago originated "Low Pressure Carbon Dioxide Systems"*. Applying CARDOX CO_2 as readily in tons as in pounds, these Systems stop fires unbelievably fast . . . without any extinguishment damage whatsoever. They have saved industry many millions of dollars.

Why not ask CARDOX to survey and give you a report on *your* danger spots? There's no cost or obligation.

*Covered by Patents Issued & Pending

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FIRE EXTINGUISHING SYSTEMS

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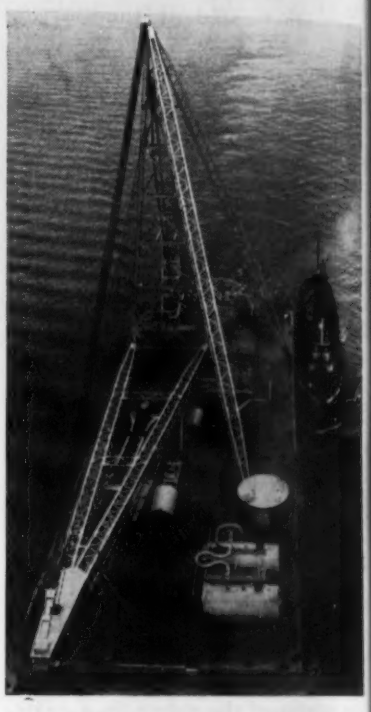
—Technical Briefs—

PILE DRIVER:

Unusual rig towed to Venezuelan Lake Maracaibo oil center.

Plowing through the seas to Venezuela is a new pile driver built and outfitted by Avondale Marine Ways, Inc. It's headed for Lake Maracaibo, one of the major oil producing centers of the world.



BIG BOOM built is part of derrick and pile driver unit built by American Hoist & Derrick Co., St. Paul, Minn., for Creole Petroleum Corp. Unit is being towed to Venezuela.

Among the forest of 6000 existing derricks, the new driver will pound in more huge concrete columns 200 ft long with a 4 x 4 ft cross section. The 80 ft pile driver lead can ram home the concrete columns while tilting 15° in any direction.

Welded Construction — Machinery, derrick and pile driver units were made by American Hoist & Derrick Co., St. Paul, Minn. The steel barge, of all welded construction measures 210 x 70 ft and is 16 ft 6 in. in depth.

After all tests were completed, the boom, pile driver lead and other miscellaneous gear were lashed to the deck. A steel plate break-water was welded to the

deck in the bow to protect machinery from seas and wave wash. Hull plating is ½ to ¾ in. thick with longitudinal framing supported by transverse trusses.

Big Boilers—Two Scotch Marine dry-back type boilers power the barge. Each has a working pressure of 175 psi, a heating surface of 3000 sq ft, and a capacity of 21,000 lb of steam per hour. Boilers are equipped with Penberthy high pressure injectors with a capacity of 2050 gpb.

One of the largest booms in the world, 175 ft long, spreads 28 ft at the base. Pile driving equipment is highly specialized. Piling used to support oil drilling rigs in Lake Maracaibo are reinforced concrete columns. Each weighs 200 tons. Cushion caps on the piling heads absorb hammer shocks.

Oil Center—Lake Maracaibo, one of the world's major oil centers, produces a million barrels of oil per day. This area has established Venezuela as the world's leading exporter and next largest producer, the United States being first.

Venezuela's production is about 1,850,000 barrels daily. Oil derricks in Lake Maracaibo are lined up for miles much like telephone poles. Creole Petroleum Corp., who ordered the driver, owns about 1700 of the 6000 derricks.

TEST MISSILE inside National Advisory Committee for Aeronautics 4 x 4 ft supersonic wind tunnel at Langley Field, Va., is inspected by engineer. Velocities inside tunnel can be pushed to more than twice the speed of sound. GE dewpoint recorder helps guard against moisture condensation which would disturb air flow.

Trained Personnel

In recent years, automatic machines have been developed to a point where it is sometimes said they can "almost think". However — despite this mechanical progress, there is still no satisfactory substitute for trained and experienced craftsmen in manufacturing a product where uniform high quality is the primary consideration. Nowhere is this fact better realized than at Wallingford. In our production departments and our research and test laboratories, craftsmen and technicians exercise their knowledge and skills to maintain the Wallingford reputation for superior quality strip and tubing.

THE WALLINGFORD STEEL CO.
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AIR POLLUTION:

Penn Salt licks acid vapor problem with ejector setup.

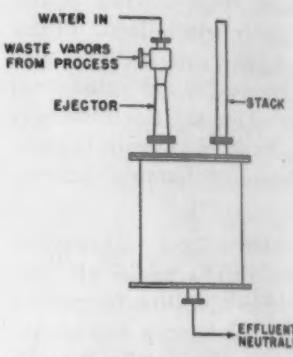
A bad case of acid vapors was taken to the cleaners recently with an ejector and neutralizing tank arrangement at Pennsylvania Salt Mfg. Co., C. R. Brown and R. W. Tomlinson of Pennsalt have reported.

A solution was sought for safe disposal of small concentrations of hydrofluoric and other acid vapor in stacks at the Cornwells, Easton and Calvert City works. Ejectors were selected because they can handle relatively large quantities of liquids and also act as an exhauster.

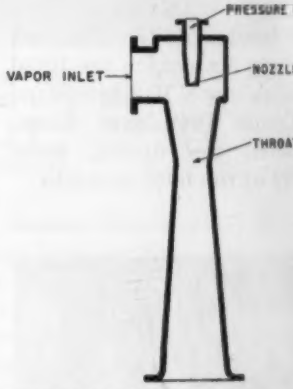
Breaks Gas Film—Factors influencing selection of ejectors include the advantage of gas film break-up due to the turbulent action in the throat and the absence of moving parts.

Water-powered ejectors also assure an adequate supply of water to scrub efficiently the vapors discharged from the process. Reason for this lies in the relationship of the vapor to water through-put. An increase in vapor through-put is not possible without increasing the water to the ejector.

Check On System—Use of the ejector provides a check on the process in that an increase in vacuum denotes a decrease in gas through-put, indicating that a blockage is developing in the system.



CROSS SECTION of a typical fume scrubber as used at Pennsylvania Salt Mfg. Co. for removal of acid vapors from stack discharge.



SCHEMATIC LAYOUT of equipment used to remove small concentrations of HF and other acids at Pennsalt plants.

First ejector used was a 4-in. Schutte & Koerting cast iron fume scrubber, rubber-lined. It was soon apparent the rubber lining was unsuitable for weak HF service. Asplit "F", an acid resistant material originally developed by I. G. Farben and brought to this coun-

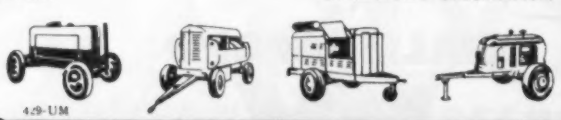
Give you these features

Double-acting spring cushioned draw bar to minimize stopping and starting shock, positive trail at high speeds, maximum roadability on rough terrain, sturdy solid steel axle beam construction . . . these features combine to make CARAVAN units outstanding among axle assemblies.

In addition, CARAVAN axles are noted for versatility. They are suitable for use on all types of industrial, field-service, construction and military equipment . . . wherever dependable portability is needed.

Both single axle (2-wheel) assemblies and 4-wheel running gear equipped with automotive type steering are available to meet a wide range of requirements. Units of either straight or drop type construction can be supplied.

Write today for United's 12-page illustrated Catalog No. 101. In addition to specifications on the complete line of CARAVAN axles, it contains descriptions of automatic surge-control braking device, retractable third-wheel assembly and other CARAVAN accessories.



4-9-UM

UNITED

THE UNITED MANUFACTURING CO.

888 W. Interstate Street • Bedford, Ohio

...y by Pennsalt, had previously ...roved valuable in HF application.

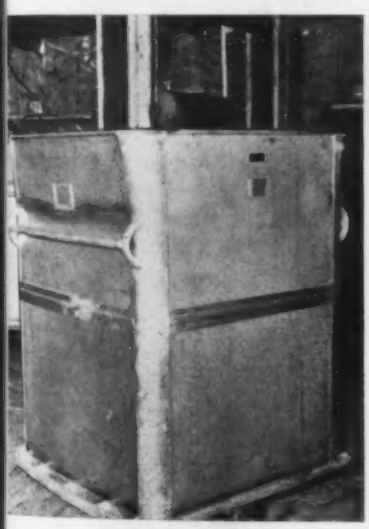
Carbon Filler—An ejector was ...abricated from a block of this ...aterial, a modified phenolic resin ...ortified with an inert carbon fill...r. It has a lower water absorption ...ate since it sets to a dense, non...orous solid.

Water is pumped through the ...ozzle at 50 lb pressure and the ...rocess exhaust gases are drawn ...nto the ejector by its aspirating ...ffect.

Effluent liquid, containing ab...orbed and entrained vapors, is ...ischarged directly into the sep...rating pot. From here, scrubbed ...apors are discharged to the at...mosphere. Liquid goes to a tank ...here it is neutralized with lime, ...hen sent to a waste lagoon.

Free Flow—The separating pot provides a free flow from the ejector discharge and is also used as a means of separating and discharging noncondensables to the atmosphere at the point desired.

The unit will develop a draft range of ½ to 6 in. of water for a gas through-put of 108 to 10 cfm of air when supplied with 21 gpm water at 80 lb pressure.



TOW CARTS of stainless steel are being used to transport nylon thread in textile mill. Stainless steel is used for the all welded carts since it will not rust even if wet thread is moved. Made from 22 gage stock, the 40 x 42 x 50 in. cans are mounted on a galvanized steel base. Automatic Heliarc welding gives smooth corners, requires little finishing. A grooved copper backing bar actuated by a pneumatic fire hose setup is used in the welding jig.

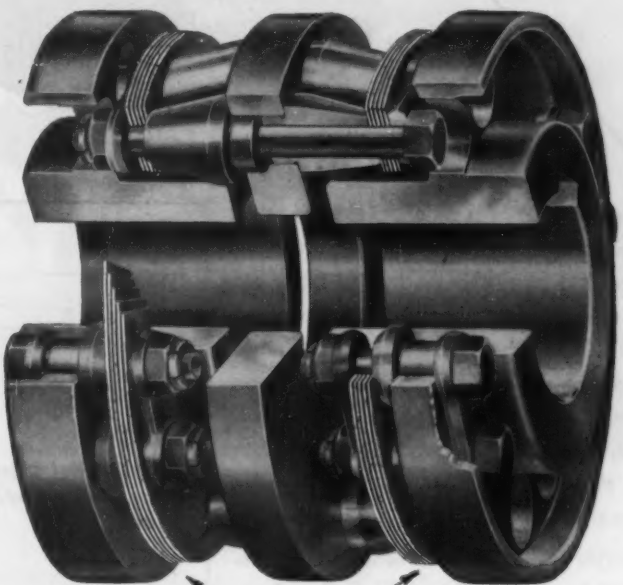
THOMAS *Flexible* ALL METAL COUPLINGS

FOR POWER TRANSMISSION • REQUIRE NO MAINTENANCE

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

Thomas Couplings have a wide range of speeds, horsepower and shaft sizes: ½ to 40,000 HP — 1 to 30,000 RPM.

Specialists on Couplings for more than 30 years



PATENTED FLEXIBLE DISC RINGS

BACKLASH FRICTION WEAR and CROSS-PULL are eliminated LUBRICATION IS NOT REQUIRED!

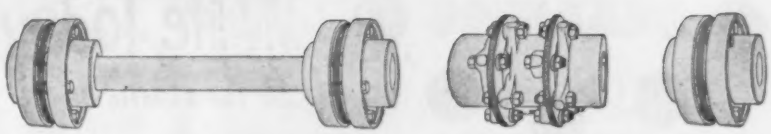
THE THOMAS PRINCIPLE GUARANTEES PERFECT BALANCE UNDER ALL CONDITIONS OF MISALIGNMENT.

• • •

NO MAINTENANCE PROBLEMS.

• • •

ALL PARTS ARE SOLIDLY BOLTED TOGETHER.



Write for the latest reprint of our Engineering Catalog.

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA

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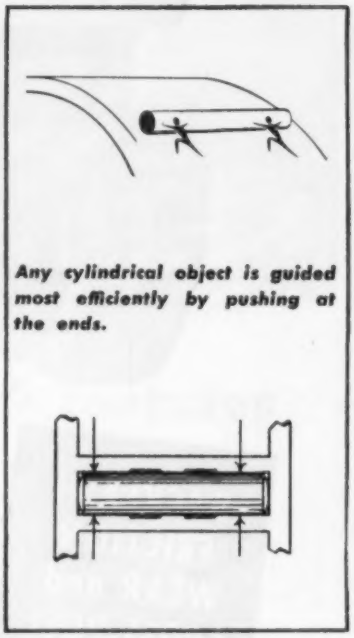
RBC

PITCHLIGN

Rollers Cannot Cock or Skew!

The middle point of a roller tending to skew remains practically constant, whereas the ends tend to move the greatest distance out of parallel. For this very reason, the cage of a PITCHLIGN bearing has been designed to guide the rollers at their ends where any tendency to skew is *immediately* corrected. Further, the rollers are aligned at their *pitch circle*, the most efficient plane for roller guidance.

PITCHLIGN bearings are dimensionally interchangeable with precision needle bearings. Get all the facts!



Any cylindrical object is guided most efficiently by pushing at the ends.

PITCHLIGN
TRADE MARK
ROLLER BEARINGS

Write Today

Ask for Bulletin SF-366

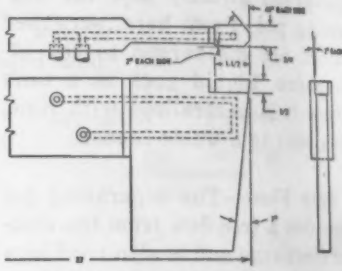
ROLLER BEARING COMPANY OF AMERICA • TRENTON, N. J.

TOOL LIFE:

Built in cooling system for cutoff tool solves problem.

An internal water cooling system in a cutoff tool solved the problem of how to keep a brazed carbide tool tip from falling off at Beloit Iron Works, Beloit, Wis.

Excessive heat was generated in cutting off the end of semi-steel drier rolls 60 in. in diam x 18 to 20 ft long and with a 4½ in. wall thickness. A ¾-in. wide brazed cutoff tool was used at 12 rpm and 0.030 in. feed per revolution.



CITY WATER circulated through cooling lines of cutoff tool used at Beloit Iron Works, Beloit, Wis., kept carbide tips from falling off, gave longer tool life.

Stays In Place—By cooling the tip and tool shank as shown in the drawing, the tip stays in place and top cratering is greatly reduced. Tubing from the side of the tool shank is connected to the city water line to give a steady flow of water through shank and under the Kennametal tip.

The water-cooled tool is operated at the same speed as before but the feed has been increased from 0.030 in. to 0.050 in.

"OK, we'll start you as a window washer."

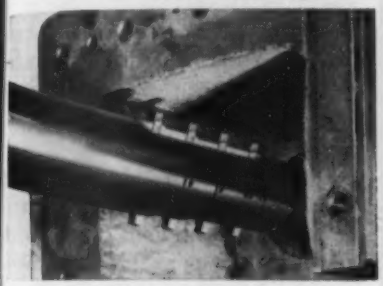
TAPER BORES:

Bar and cutter simplify cutting of taper bores.

Cutting of long taper bores on piece parts has been simplified with a recently designed multiple cutter roughing bar and floating taper cutter. The tools eliminate individual turning and hand fitting of every bushing necessary with the cam type boring bar.

Only two passes are required with the tools designed and manufactured by Madison Mfg. Co., Muskegon, Mich. Using the new tools, the work remains stationary while the bars revolve.

Finish Reams—For the second pass the floating taper cutter in a



MULTIPLE CUTTER roughing bar, above, and floating taper cutter, below, have simplified cutting of taper bores. Hand fitting of bushings, necessary with cam type boring bars, has been eliminated.

special bar finish reams the stepped bore to size.

Floating action of the cutter produces the accurately sized and tapered hole required, while the two blade principle insures a good finish and eliminates the possibility of a chip scoring the surface.

By changing over from a cam type bar to the new type tools, 18½ hr of combined machining and hand fitting time on each dieing machine frame may be saved, eliminating time previously spent in individual hand fitting of tapered bushings.

When the products you make call for a special fastener... to add extra holding strength, simplify design and production requirements or to cut costs... you'll find that it pays to call us in. Circle B fasteners, individually designed to your jobs, are made by modern methods to meet volume demands.

To simplify specifying and ordering... be sure you have the latest catalog. No. 51 is the most complete and concise you can use. Write for your copy.

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BOLT COMPANY
Division of Buffalo-Eclipse Corporation
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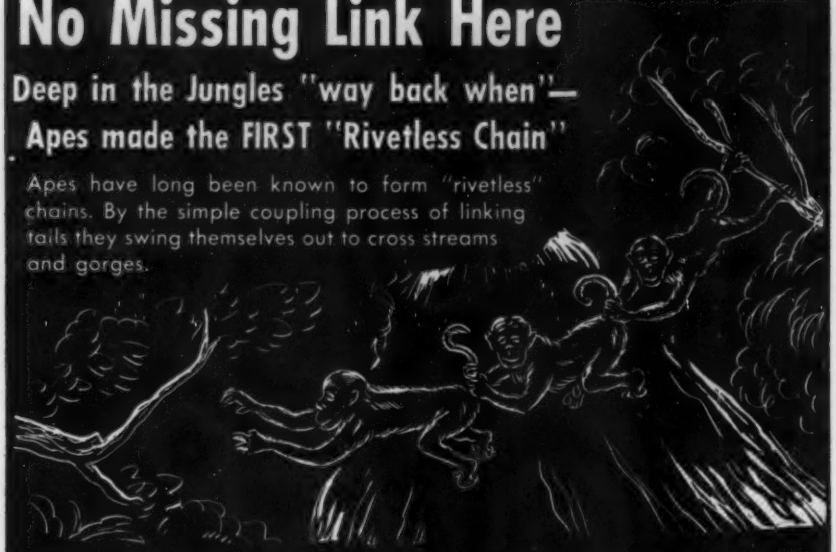
No Missing Link Here

Deep in the Jungles "way back when"— Apes made the FIRST "Rivetless Chain"

Apes have long been known to form "rivetless" chains. By the simple coupling process of linking tails they swing themselves out to cross streams and gorges.



Drop-Forged Rivetless Chain another FIRST by JERVIS B. WEBB COMPANY

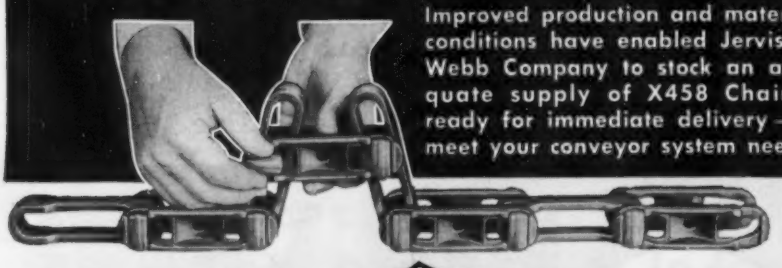
Proved by years of dependable service is the Drop-Forged Rivetless Chain, first developed by Jervis B. Webb Company for Trolley Conveyors. Simple and strong, it is cheaper and lighter per unit of ultimate strength than any other type of conveyor chain. It can be installed or removed by unskilled labor. Having no rivets, welds or bolts, it requires no special or joining links and may be disconnected at any point, yet it is so designed that it cannot become disconnected while in service.

The No. X458 Chain (illustrated below) is completely interchangeable with the Webb FIRST — the original No. 458 Chain designed in the early Twenties by Mr. Jervis B. Webb. X458 Chain has the improved webbed side link which substantially stiffens it, preventing telescoping while in service.

Need Conveyor Chain? **NOW**

We're In Position To Make
IMMEDIATE DELIVERY
X458 Drop-Forged Rivetless Conveyor Chain

Improved production and material conditions have enabled Jervis B. Webb Company to stock an adequate supply of X458 Chain — ready for immediate delivery — to meet your conveyor system needs.



CONVEYOR ENGINEERS AND MANUFACTURERS

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BLAST CUTTING:

High velocity, gas propelled abrasives cut hard materials.

Cutting by means of a high velocity stream of gas-propelled abrasive particles provides a fast accurate method for controlled removal of hard-to-work materials.

Controlled cutting of metalized films on glass and ceramics, drilling of thin sections, etching, deburrring and other similar operations may be accomplished with the Airbrasive Unit developed by S. S. White Dental Mfg. Co. of New York.

Carbide Nozzle — In operation, the unit directs a gas-propelled abrasive stream against the work surface through a tungsten carbide nozzle. As it leaves the nozzle the stream travels at approximately 1100 fps and is 0.018 in. in dia.

Cutting action is accomplished without the usual increase in temperature and without the pressure and vibration ordinarily experienced with other cutting methods, especially helpful on germanium, whose physical or electrical properties might be affected by heat and shock.

No Direct Contact—Lack of direct contact of a tool with the work eliminates dimensional variations due to wear of the cutting tool or surface irregularities in the work.

Despite the ease with which it cuts hard and brittle surfaces, the process has little effect on resilient or soft materials, such as rubber, cloth and certain types of plastics. This selective cutting effect is useful in removing metalized films coated on a relatively soft base.

Aluminum Oxide—Normally, a specially processed aluminum oxide power is used as the abrasive. For applications which require a lighter abrasive a classified dolomite can also be supplied.

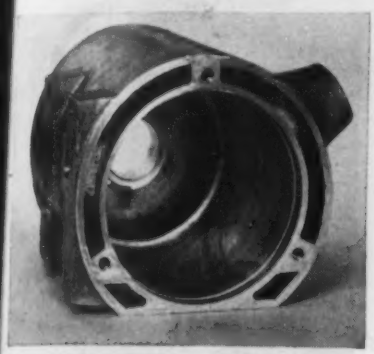
Any dry inert gas can be used as the propellant. Carbon dioxide is generally preferred, however.

MACHINING:

Precision operations vital in making motor housings.

While abrasive saws are designed primarily for roughing operations, they are often called upon to perform cutting operations to fairly close tolerances.

To maintain tolerances with the flexible abrasive cutting wheel, a large amount of precision machining is essential in manufacture of saw parts. A typical example is an aluminum motor housing used on the M-16 swing cut abrasive saw produced by Stone Machinery Co., Manlius, N. Y.



MOTOR HOUSING used on Stone Machinery Co. abrasive swing saw is machined to close tolerances at Beaver Machine & Tool Co., Syracuse, N. Y.

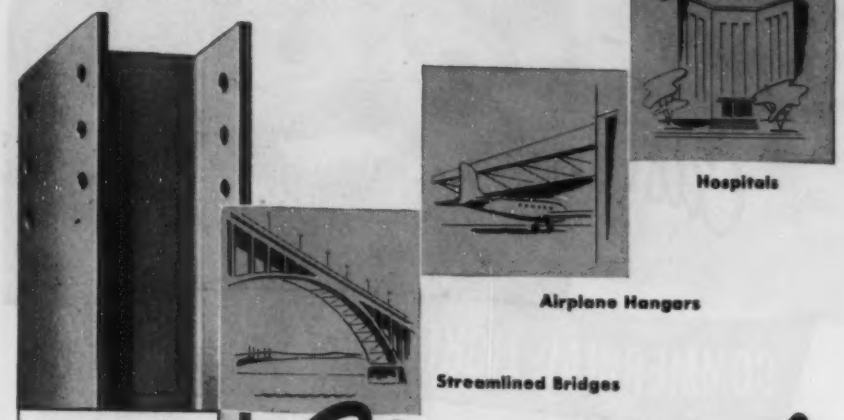
Guards Circuit — The housings, bored, faced and milled inside and out at Beaver Machine & Tool Co., Syracuse, shield the motor and power conduits of the saw.

The piece is locked to the 3-jaw chuck of a 36 in. Bullard vertical turret lathe. First operation bores the ID to a depth of 6 7/16 in., with a diameter 5.429 to 5.426 in. wide. A small counter bore and bore are made at the base. Final step on the front area requires facing rough surfaces around the centerbore.

Assembly Milling — Before facing, the rear area of the housing is placed on a plug to machine a turned diameter to 5.750 to 5.754. Flat surfaces of the piece were milled by assembly line methods to gain greater and quicker output. The base is milled on the circuit box faced.

Screw holes and support holes are drilled and tapped on a Buffalo drill press.

"Steel Permits Streamlining Construction with Safety, Endurance and Economy"



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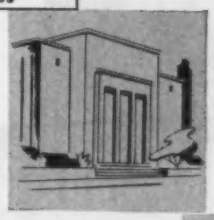

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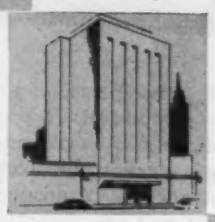
Fort Pitt Bridge has specialized in structural steel for over 55 years. Why not take advantage of this broad experience on your next structural steel project.



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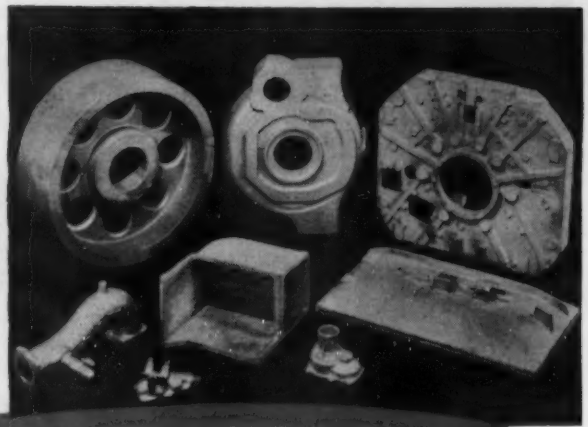

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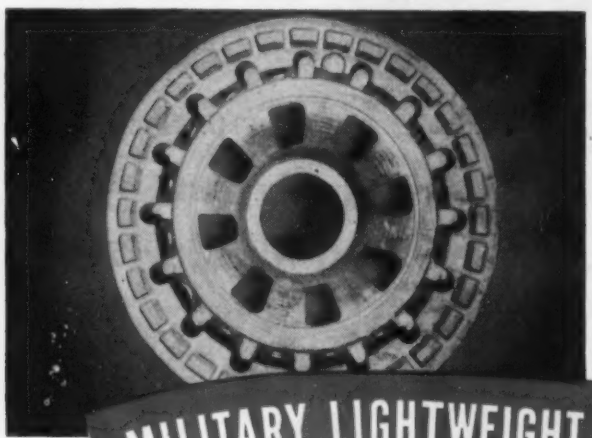
Your commercial requirements for lightweight castings in aluminum or magnesium may be tough, but we'd welcome an opportunity to look them over. We've tackled a good many diversified casting problems over almost a half century.

Our four completely equipped plants and their trained personnel are at your disposal.



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MILITARY LIGHTWEIGHT CASTINGS

Aircraft wheels, strut parts, engine parts and miscellaneous components are being made every day at our plants, in aluminum and magnesium. X-Ray inspection, close attention to detail, complete facilities for production in sand, semi-permanent and permanent mold form.

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INDUCTION HARDENING:

One man does the work of six in hardening washing machine parts.

A 48 pct reduction in cost of hardening basket shafts for use in washing machines has resulted through the use of two 15-kw electronic induction heaters at the Syracuse, N. Y., plant of the Easy Washing Machine Co.

Entire cost of the hardening process, including labor, power, repairs, depreciation, and overhead, has been reduced from 13¢ to 6¾¢ per basket shaft.

HARDENING COSTS for washing machine shafts made by Easy Washing Machine Co. were cut 48 pct through use of 15-kw induction heaters. One man now does work formerly performed by six. Induction coil is inside quench ring.

Replaces Cyanide — Before adopting the induction heater method, shafts were hardened with a cyanide process. In addition to the cost of the chemicals, three shifts of two men were required to harden 1600 shafts.

With the induction heaters, made by General Electric, one man can harden 1600 shafts in one 8-hr shift.

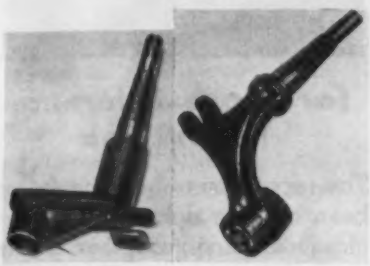
Better Control—Better hardness characteristics are reported than were generally achieved under the old process. The equipment allows exact and automatically controlled heating and quenching times.

DESIGN:

Conversion of trailer axle from weldment to casting cuts costs.

Foundrymen and designers are benefiting from a research program carried on by the Steel Founders' Society of America. Lower costs, metals conservation, better part design and improved service factors are sought by the program.

Typical of conversion redesigns which have yielded practical results is that of a trailer axle. Originally a welding, production of the part was found impractical because of cost and delivery requirements.



CONVERSION of trailer axle from weldment, left, to steel casting, right, cut production costs 28.2 pct. High output needs made production of part by welding difficult.

Conversion—Foundry-engineering analysis showed conversion to a steel casting would be practical and preferable. Quantities were too small to warrant the expense of forging dies, yet too large for economical production by welding.

Appearance of the part, as a 1-piece steel casting, was improved, and better weight-strength ratio would be obtained through more advantageous distribution of the metal in the steel casting. Total cost of the part was reduced 28.2 pct as the outcome of redesign.

PLATECOILS
(REPLACE PIPE COILS)

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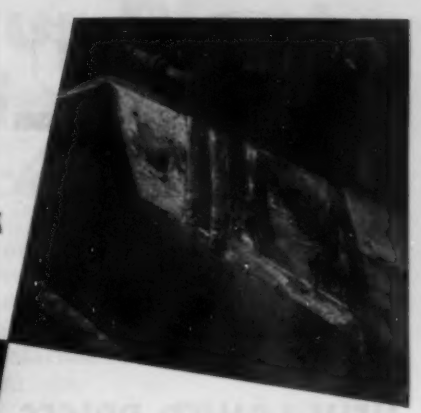

WITHOUT DOWNTIME for CLEANING or REPAIRS

at the Lycoming Spencer Division Avco Corp., Williamsport, Pa.

The only time this Platecoil was removed in over a year at Lycoming Spencer was to take its picture. The single 22" x 23" Platecoil has heated a 100-gallon Parkerizing tank, in daily use, *without downtime.* Built of Electro-polished Stainless Steel, the Platecoil has required *no cleaning or repairs.* Any deposit that builds up on the coil during the course of operation is "shocked off" when the steam pressure is dropped in the coil.

Notice how easy it is to lift the Platecoil out of the tank when the time comes that it does have to be cleaned, repaired or replaced. There are just two connections to loosen and both are outside the solution. The Platecoil merely is lifted out of the tank and replaced with little or no delay in production.

Platecoils have other advantages, too. They have about twice the heating area for a given space than can be obtained with pipe coils. Thus smaller size Platecoils can be used to save initial cost, tank space and handling time.

Learn how you can cut your heat transfer costs by sending today for Platecoil bulletin No. 73.

PLATECOIL gives you these ADVANTAGES

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- Increased Tank Capacity
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- Easy to Clean

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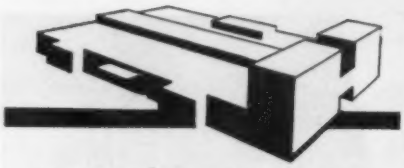

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—Technical Briefs—

STEELMAKING:

Longer life of basic brick lining offset by high costs.

Higher costs of bricks, plus maintenance, more than offset advantages of basic brick linings in steel ladles, C. H. Bacon of John Summers & Sons, Ltd., England, reported at a recent steelmaking conference. The conference was sponsored by the British Iron & Steel Research Assn.

Low carbon rimming steel with high iron content slags constitute most of the steel made at the Summers plant. These are extremely severe on the usual type of ladle lining.

Stabilized Dolomite — Trials with panels of basic bricks, six bricks wide for the full height of the ladle gave promising results with stabilized dolomite.

When a complete ladle, except bottom, was lined with this material slag built up on the bricks on the first charge. After the second charge some skull had formed.

Short Life — The ladle lasted four charges. A second ladle worked for seven charges before it became necessary to remove the slag layer. This had to be repeated after another five charges. Total life was fifteen charges.

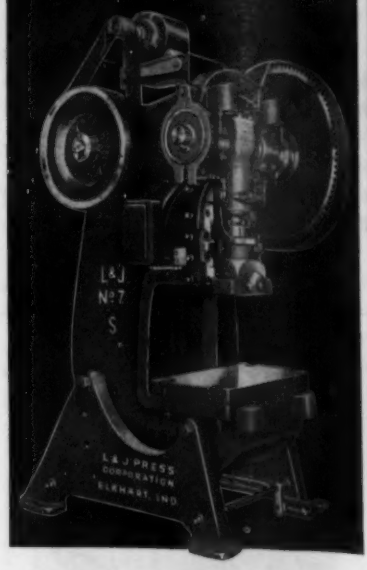
Trials were also made with magnesium silicate refractories, at first with Serpex (serpentine enriched with magnesia) and subsequently with serpentine, with increasing proportions of first china clay and later fireclay.

Ladle lining behavior was similar to the established dolomite lining.

Slag Buildup — Chief difficulty encountered was due to the build-up of slag. Action of basic slag upon a basic brick produced a viscous slag which tended to freeze on the brick face.

Trials of stabilized dolomite sleeves on stopper rods had been very successful. Failure of a rod through sleeve wear was practically

L&J PRESSES



for Close-Tolerance Production

The reputation of L & J Presses has been built by doing tough jobs—close-tolerance jobs that require sustained accuracy. These rigid, precision-built presses have simplified difficult press work on a wide range of applications. They are built for it! Heavy, deflection resistant frames . . . ruggedly designed slides with extra long gibs . . . and many other important features all contribute to their efficient operation.

L & J Presses are made in 12 O.B.I. models—back geared and plain flywheel types—and 8 sizes from 6 to 80 ton capacities.

Write for Literature

NOW—AIR CLUTCHES

L & J Presses are now available with L & J-Fawick Air Clutches for greater productivity. Controls for inching, single stroke and continuous running. Variable speed drive. Ram counter balances. Greater safety with the new L & J air release spring-set brakes. Two-hand or foot control. Automatic or one-shot lubrication.

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unknown, though it had previously been fairly common.

Wear on dolomite sleeves was negligible in the slag layer. The material was eroded in the metal layer but not as much as fireclay. Where a dolomite sleeve was in contact with, and immediately above a fireclay sleeve it was subject to increased wear.

Better Melting Practice

Keen competition and high operating costs both place a maximum premium on efficient melting practice to keep scrap losses at a minimum, R. F. Schmidt, metallurgist, Ajax Metal Div., H. Kramer & Co., recently told the Philadelphia Nonferrous Foundry Society. Practice recommended by Mr. Schmidt in melting bronze and brass included:

1—Furnace atmosphere should be slightly oxidizing.

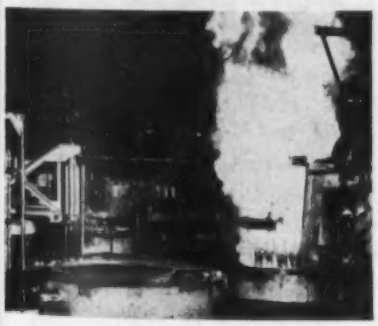
2—Charge should be melted quickly and poured as soon as proper temperature is reached.

3—Gates and other charge metal should be clean of all sand, turnings free of oil.

4—Castings should be poured at proper temperatures, checked with pyrometer.

5—Proper skimming is required.

6—Phosphor copper should be used in tin bronzes, leaded bronzes and red brasses but not in manganese and aluminum bronzes and alloys high in zinc.



FIFTEEN HUNDRED lb of carburized SAE 8620 cam gears are being quenched in oil to a minimum Rc 58 and a hardenable case depth of 0.040 to 0.060 in. Surface Combustion radiant tube carburizing furnace has RX gas atmosphere. Vertical hanging fixture minimizes gear distortion

Build Your Plant in Birmingham

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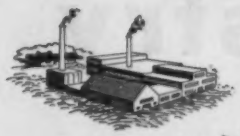

When you visit this Southern industrial, transportation and distribution center, you will see many large enterprises like the Birmingham Slag Company that started, in a small way, just a few years ago.

BIRMINGHAM SLAG COMPANY

Second Largest Slag Processor in the Nation

Slag was formerly a waste by-product of Birmingham's blast furnaces. Founders of the Birmingham Slag Company foresaw the commercial possibilities of slag. They recognized that centrally located Birmingham would be the ideal distribution point to serve the South. They pioneered the first Southern plant to process slag. Rapidly their operation grew as slag uses diversified and demand boomed with the South's broad-scale building program.

Anywhere you go in the South, you will now see Birmingham slag . . . as ballast on the busy lines of railroads . . . in asphalt and concrete paving and the macadam bases of modern highways . . . in every kind of reinforced concrete construction . . . as moulded concrete block and tile . . . in fact wherever enduring aggregate is needed.

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Your plant, if soundly operated, can look forward to substantial, steady growth in Birmingham today because the South is marching forward at an ever faster rate. Many pioneering opportunities to serve this Southern market exist now in Birmingham for varied types of industry. Our Committee will be glad to prepare specific information on the prospects for your plant, office or warehouse in Birmingham. Write—or better still, visit Birmingham and see for yourself!

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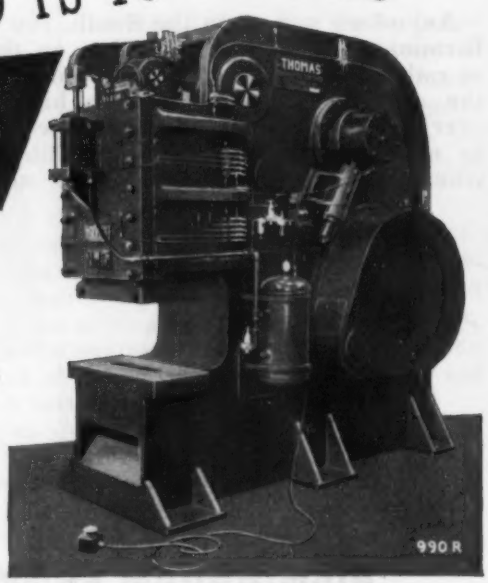

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- Air Operated Clutch
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- Quick Tool Changes

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For rounds, squares, flats, angles or channels

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PUNCHES · SHEARS · PRESSES · BENDERS · SPACING TABLES

—Technical Briefs—

CHROME-GLASS COAT:

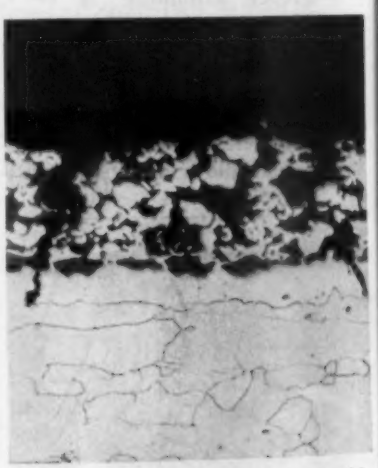
Protects molybdenum against oxidation for high-temperature uses.

With its 4750°F melting point, molybdenum might be used in jet engines if it could be protected from rapid oxidation. National Bureau of Standards has come up with a chromium and frit (glass) coating that gives better protection than chromium or ceramic coatings alone.

Coated specimens were tested for oxidation under tension at 1500° to 1800°F and flame-tested at 2000° to 3000°F. In the lower range, specimens lasted for 1000 to 3000 hours and for as much as 7 hours at 2800°F with no load.

Best results were obtained after application of a glass-free chromium-bearing base coat, followed by a glass seal coating. A third coat, consisting of a lower-melting glass, gave greatest durability.

Glass Absorbed — Microscopic examination of sections shows that the chromium of the base coat has a somewhat porous structure, formed by the diffusion-welding of the chromium particles to each other and to the molybdenum. Glass is subsequently absorbed in this structure during firing.



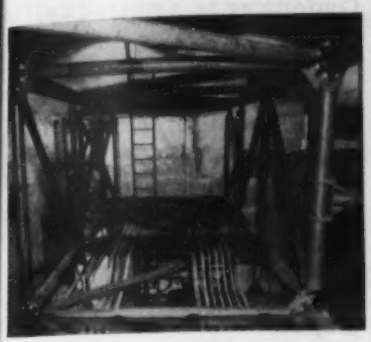
SELF-SEALING Photomicrograph of molybdenum section with chromium frit coating. Glass seal coat showed tendency to seal thermal shock cracks. Mag. 150X.

Although thermal strain and rapid creep tend to cause cracking in the coating, adherence is excellent and the glassy layer tends to reseal the fissures.

STOP NUTS:

Hold together world's largest human centrifuge under tremendous loads.

In the development of a super "spinner" to study effects of high speed maneuvers on jet pilots, the construction problem of holding the human centrifuge together under tremendous forces had to be solved. Elastic stop nuts did the job.



GIANT ARM: Tubular steel arm for the hum-centrifuge is made up of sections held together by elastic stop nuts. Each set carries a load of 225,000 lb.

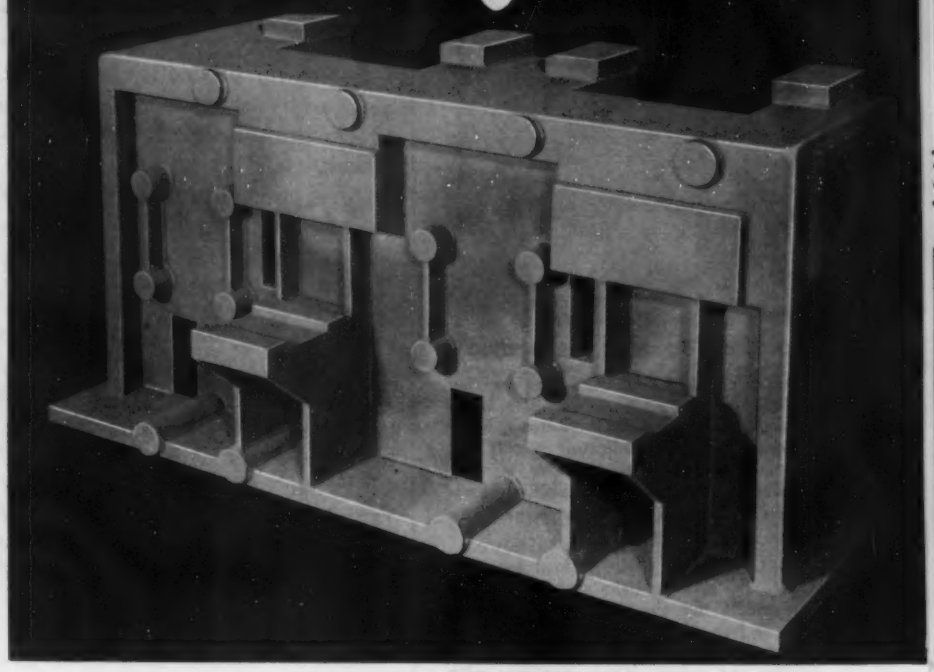
Designed and built by McKiernan-Terry Corp. for use at the Naval Air Development Center, Johnsville, Pa., the machine, said to be the largest of its kind in the world, is capable of exerting forces up to 40 times the test subject's weight. The centrifuge consists of a gondola at the end of a 50-ft arm which can whirl the subject horizontally at a speed of 174 mph.

Tensile Loads—Because of the high tensile loads placed on the bolted joints of the arm's welded tube structure, strength and resistance to vibration were the principal design factors of the mechanism. Largest tensile load on any single joint is 225,000 lb which is carried by eight 1-in. diam. alloy steel bolts and self-locking, vibration-proof elastic stop nuts.

Strength tests of a sample joint showed that the tubing failed, as was expected, but without damage to flanges or bolt and nut sets.

The complete arm structure is made up of four sections held together with 160 bolts and elastic stop nuts. Holding qualities of the nuts enable them to resist unlocking and destructive play.

use castings?



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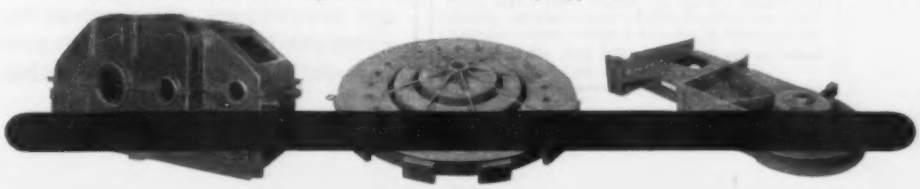

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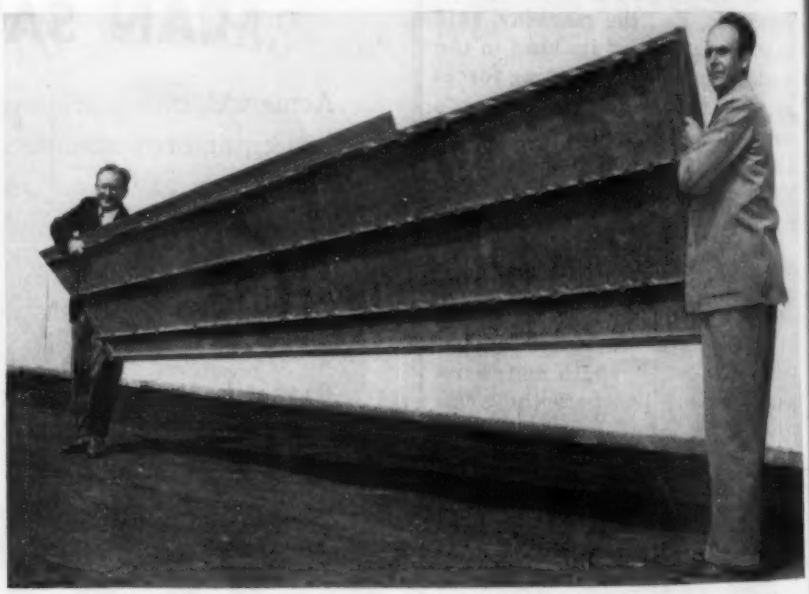
CAST WINGS:

Northrop, Alcoa cast 16-ft magnesium wing panel . . . Process secret.

Successful production of a cast magnesium aircraft wing section by Northrop Aircraft, Inc., Hawthorne, Calif., marks an exciting turning point in a closely guarded research project. The magnesium casting, 16 ft long and adhering to exacting tolerances, is believed to be the largest cast aircraft surface ever produced.

Sponsored by the U. S. Air Force, the research is an important part of the nation's defense program. It is believed that cast wings can be produced much more rapidly and economically than conventional aircraft wings fabricated by attaching aluminum skins to spar and ribs with rivets or spotwelds.

Save Aluminum—Use of magnesium for the castings is a vital part of the program designed to take pressure off aluminum supplies.



LIGHT AND LONG Believed to be the largest aircraft surface ever cast, this 16-ft airplane wing section was cast in a single piece from featherweight magnesium. Northrop Aircraft, Inc., and Aluminum Corp. of America are cooperating in work on this highly secret Air Force project. Casting of wing sections is expected to speed production and cut costs.

Techniques used in producing the sample casting were evolved through extensive experimentation and development of numerous innovations in standard foundry procedures. But details of the casting methods employed are still secret. It is known, however, that the wing section wast cast in sand from AZ-92 magnesium alloy.

Making aircraft surfaces such as wings is particularly difficult since tolerances and strength-weight requirements are so exacting. Considering its size, the wing section is extremely thin, measuring only a ¼ in. in some places. Conforming to aircraft quality standards, the wing casting is free of visual evidences of porosity or other faults.

Production of the casting was achieved through the joint engineering efforts of Northrop and the Aluminum Co. of America at Alcoa's Vernon, Calif., plant. Northrop employed Alcoa facilities under subcontract for the project.

More Experiments—Mr. John K. Northrop, president of the company, warns that, "Obtaining of this first experimental casting is most significant, but it should not create the impression the time has arrived when airplane wings can be cast in quantity. Much additional experimentation and testing must occur before this method of manufacture is ready for use in aircraft production."

Most Tonnage Products Sold Out Through 1952

Consumers pressing all sources for short-term steel . . . But most are leery of long-term commitments at premium prices . . . Ingot rate bounces back to 96.5 pct of rated capacity.

Most steel mills are not going to be able to book much, if any, new civilian business for the rest of this year. When this fact seeps home at the consuming level, the scramble for steel is expected to be accelerated.

So far consumers are more cautious than had been expected. It is true that they are (1) putting terrific pressure on the mills, (2) bombing the conversion market for all it's worth, (3) following many leads on foreign steel, and (4) keeping in touch with warehouses to see how much they can help. But nearly all effort is aimed at short-term supply.

Some Doubts—Few steel users are willing to make expensive commitments for more than 3 or 4 months in advance. There are indications that some actually distrust the market for their manufactured products. One thing is sure, they don't want to take on any high-priced conversion or foreign tonnage until they are sure demand for their products warrants it. The alternative would be high-priced inventory. This they are avoiding like the plague.

Heat's On—The post-strike impact of military priority is beginning to be felt. With November set as the curfew for catching up in military and atomic energy orders, jammed mill schedules are being kept fluid by new directives. Steel companies are still striving for orderly production schedules which improve efficiency and cut costs. But there is little chance they will achieve this goal in the next few months. Just when they are set to roll, another overriding priority hits without notice, and reshuffling of schedules starts all over again.

Military setasides are not expected to be large enough to cover the influx of high priority orders. In the weeks ahead the military may take more than 30 pct of mill shipments.

Carryovers — Mills are more than 3 months behind on some civilian orders now. It seems certain that June orders will carry over into September. Fourth quarter orders are expected to be subject to delivery by February. This means that the Controlled Materials Plan can't be made realistic before the first quarter of '53.

Inequities — The steel strike brought out many inequities in CMP that might otherwise have gone unnoticed. It is pointed out that consumers who have received no steel since June 2 must have been violating inventory regulations if they have kept operating at a high level. In all fairness it should also be pointed out that some of these firms undoubtedly had steel in transit when the strike came, and some were able to pick up tonnage from abroad, from warehouses, etc.

It is notable that some consumers still have considerable steel on hand. In some cases plant shutdowns resulted from shortages of component items rather than raw steel.

The National Production Authority plan for strictly limited inventory on the honor system is doomed to failure. Inventory controls were not effective when they were supposed to have teeth in them. NPA has asked steel firms to cooperate by turning in names of suspected inventory violators. It is hardly realistic to expect them to turn in their best customers.

Slow Comeback — Auto makers are as slow to recover from the strike as they said they would be. Several companies do not even plan to start production until Aug. 18. Even then they have no real hope for smooth operation. After a brief comeback, Ford had to again close all assembly plants this week. Auto people believe their production will be set back more than 2 months.

Appliance people are generally cautious. They are making their presence felt at mill level, but they are treading the conversion trail with soft steps. Yet one large appliance maker expects 20 pct of its requirements for most of the next year will have to come from conversion and foreign sources.

Rugged Outlook — Conversion costs are running double, sometimes triple, regular mill prices. Consumers are paying as much as $110 a ton for ingots. In a few instances even higher prices have been paid. Average is around $100 a ton. To this must be added breakdown and rolling fees, extra handling and freight charges. Then about one-quarter of the ingot has to be lopped off as scrap.

All tonnage products are sold out for the balance of the year. Demand for plates, forging billets, hot-rolled sheets and cold-finished and hot-rolled bars is terrific. Mechanical tubing and boiler tubing are just as tight. Alloy mills are sold out to the end of the year, except for small tonnage items.

Nearing Capacity—Steelmaking operations this week are scheduled at 96.5 pct of capacity, up 8 points from last week's revised rate.

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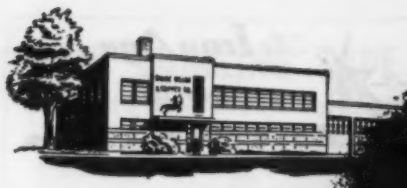

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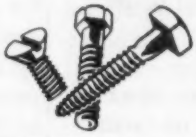

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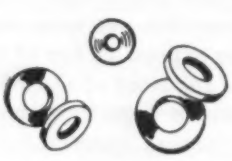

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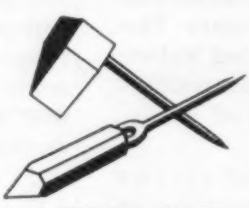

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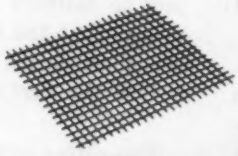

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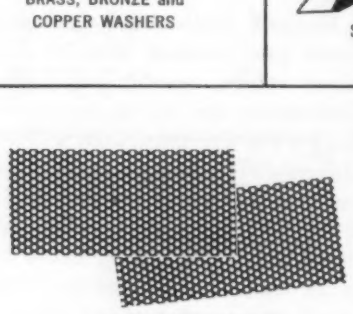

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Market Briefs

Strikes Prolonged—Strikes continued early this week at Allegheny Ludlum Steel Corp., the Ashland, Ky., plant of Armco Steel Corp., Newport Steel, at Newport, Ky., and Acme Steel, at Chicago. Federal conciliators moved into the picture and meetings were scheduled in an effort to break the deadlocks. The main points at issue involve incentives and management rights. In the case of Acme the chief bone of contention is seniority.

Steel Grief—Some steel officials are worried about their civilian customers. As military orders continue to roll up, fear has been expressed that some civilian customers may have to shut down later in the year. The alternative would be to ease military requirements to "give the civilian guy a break." One suggestion: As soon as immediate military production is taken care of, military inventory should be deferred so civilian industry can be kept going.

Deferment Cancelled—National Production Authority rescinded its telegraphic order to steel plants which directed a 15-day deferment of opening fourth-quarter books. At the same time, rules were changed with respect to acceptance of defense orders in reserved space during the fourth quarter. This latter action eliminated for November deliveries the 15-day scheduling time as provided under M-1 for those items having a 75-day lead time. It reduced the 15-day period to 7 days for those items having a 60-day lead time.

Steel Expansion—McLouth Steel Corp. is carrying out major expansion programs at two of its Michigan plants. Additional heating capacity is under construction at the company's Trenton plant to handle stainless production in greater widths than is currently possible. Rolling equipment, continuous anneal and pickle facilities, equipment and buildings are planned for the Detroit division.

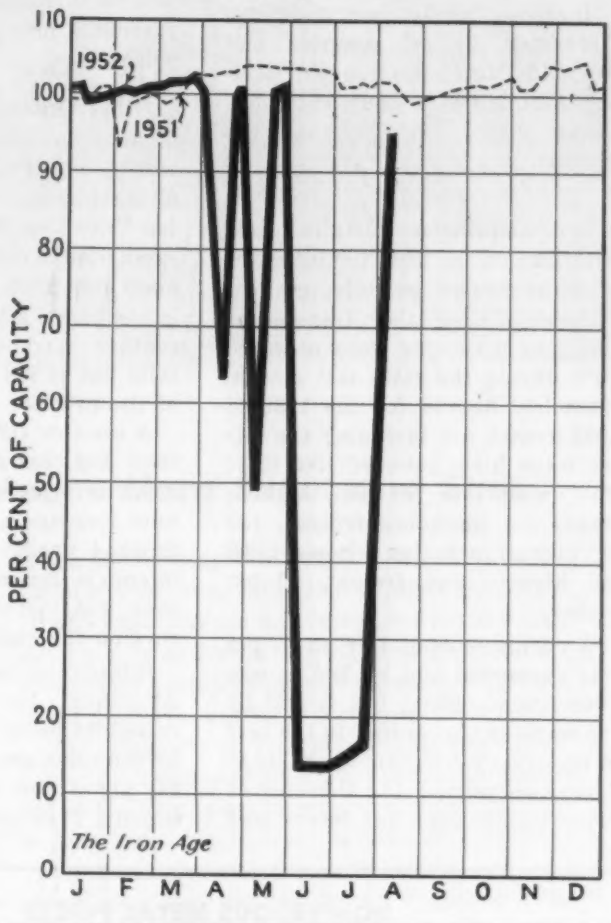
Farm Machinery Shortage—A serious shortage of new farm machinery and equipment for next year is feared by National Production Authority's Farm Machinery and Implements Div. Inventories are depleted and new production is in doubt. Production for 1953 must get under way during the third and final quarters of 1952. But as a result of the steel strike not many farm equipment manufacturers will get the steel already allotted them.

Prefab Price Cut—Stran-Steel Div., Great Lakes Steel Corp., a leading manufacturer of Quonset huts, cut prices of prefabricated buildings for farm, commercial and industrial use by 7 to 16 pct. Average reduction was 10 pct.

Copper Exports—Amount of refined copper from foreign ores and concentrates available for export will be sharply increased during the fourth quarter. Office of International Trade has set the quota for the quarter at 45,000 short tons as compared with 42,000 tons allowed during the third quarter.

Tax Writeoff—Defense Production Administration approved a certificate of necessity for accelerated tax amortization amounting to $32,275,000 for Delaware River Steel Corp., New Castle County, Del. The certificate was the largest approved in a group 257 requested for new or expanded defense facilities.

Steel Operations



District Operating Rates—Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	West	Buffalo	Cleveland	Detroit	Wheeling	South	Ohio River	St. Louis	East	Aggregate
Aug. 3	99.0*	99.5*	85.0*	94.0	88.0*	106.5	94.5	105.0*	67.0*	87.5	46.0*	99.0	94.5	98.5*
Aug. 10	96.0	97.5	96.0	96.0	101.0	109.0	101.5	103.0	92.0	97.5	50.0	104.0	92.0	96.5

Beginning Jan. 1, 1952, operations are based on annual capacity of 108,587,670 net tons.
* Revised.

Aluminum Request Halved by OPS

Price hike is 1¢ for pig, ingot; 5 pct on mill products . . . Producers unhappy, plan another try . . . Alcan increases price . . . Zinc drops 1½¢, tin fluctuating—By R. L. Hatschek.

Office of Price Stabilization, after several days of haggling over the amount, last week issued the primary aluminum price increase order. It amounted to 1¢ per lb for pig, ingot and alloy pig; and 5 pct for alloy ingot (including billet) and mill products, effective Aug. 4. This brings the price of ingot to 20¢ per lb and the price of pig to 19¢.

Increase totals just half the Aluminum Co. of America and Reynolds Metals Co. request (Kaiser Aluminum & Chemical Corp. asked slightly more than the others).

Try Compromise—Detailed presentations on the need for increases of the requested amounts, to offset higher costs for labor, transportation and materials were made to OPS during the talks last month. Reynolds' figures for the 1939 to 1952 period, not including the latest wage hike, sounded like this: Raw materials, 61 pct higher; wages not including fringes, 133 pct higher, including fringes, 150.3 pct higher; and freight, 80 pct higher.

A compromise of 1.5¢ and 7 pct was suggested and backed by one government official but it fell by the wayside. According to the text of the order itself, "On the basis of figures submitted, the Director of Price Stabilization has determined that an increase of 1¢ per lb . . . and of 5 pct in the ceiling prices . . . is required to restore the general level of unit profits prevailing before Korea."

New Plants — Producers said that the current expansion program (see page 81) is at stake and one suggested that a logical move would be to compile cost figures on new facilities as they are built and present a new case for increased prices.

Other Orders—The above order is also applicable to fabricators who do not produce their own pig or ingot and an amendment to Ceiling Price Reg. 67 was issued at the same time to cover resellers of primary aluminum mill products. This is the order allowing a fixed percentage markup for anyone who sells but is not the manufacturer of the product.

A reliable OPS source told THE IRON AGE that no order or amendment on price changes for aluminum forgings and castings or for finished products containing aluminum is imminent. There is, however, considerable industry pressure on the nonferrous branch.

Interesting to note is that the Aluminum Co. of Canada has raised its price to U. S. consumers by the same amount. Alcan's price for pig is now 19¢ per lb, including the 1½¢ per lb import tariff.

Zinc Drops—Slab zinc stocks at the end of July totaled 96,919 tons for a 3-year high. This, of course, is one of the results of the steel strike, during which there was practically no steel being galvanized. Last month's production was 76,930 tons and total shipments were only 43,353, even lower than the 47,265 total for the preceding month. This surplus production for the month was piled on top of stocks adding up to 63,342 tons.

Net result was a drop in prices. Prime Western grade is now selling at 13.5¢ per lb f.o.b. East St. Louis, a reduction of 1.5¢. And trading at the new level was only moderate at press time. This is true of High Grade and Special High Grade as well as galvanizing grade.

Quick Recovery—But a general upsurge in sales can be expected as soon as the steel industry is firmly back on its feet. When the auto industry gets back in the swing of things, demand for the higher zinc grades will also return. Only difference is that the supply cushion will be larger than the industry is accustomed to but this can also be expected to decline as consumption was running high before the steel strike.

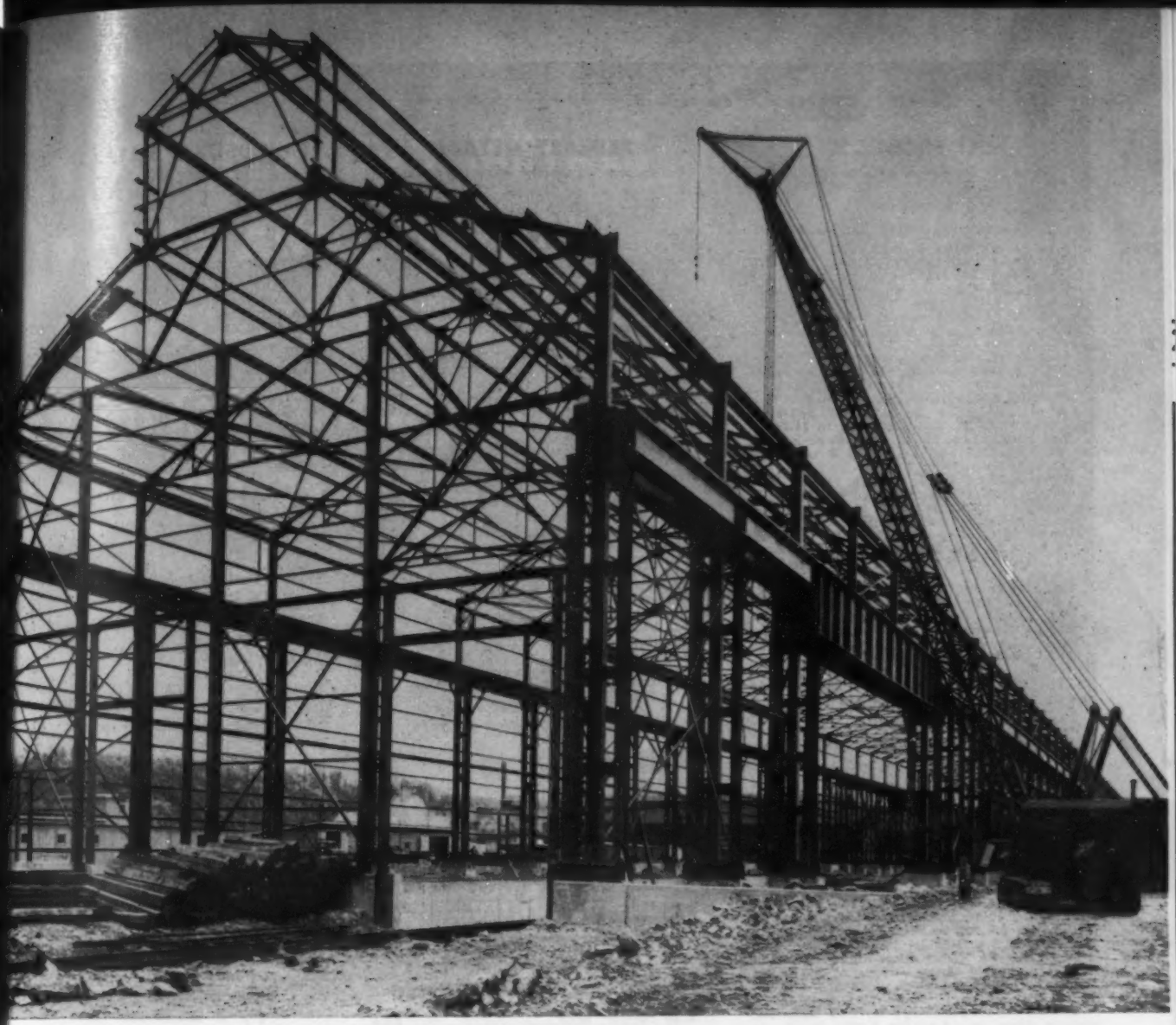
Tin Fluctuates — Shortly after U. S. importers of tin were allowed to resume operations Aug. 1, world tin markets began slipping, as anticipated. Singapore dipped as low as $1.11¼ ex smelter but by the end of last week had again risen to $1.14⅛ per lb. Latter price is equivalent to $1.17⅝ c.i.f. New York. The London market displayed similar tendencies.

It's still too early to have a prompt quotation in the New York market so the Reconstruction Finance Corp. price of $1.21½ stands. For future delivery, the week ended with August at $1.20, September at $1.18 and October at $1.17.

NONFERROUS METAL PRICES

	Aug. 6	Aug. 7	Aug. 8	Aug. 9	Aug. 11	Aug. 12
Copper, electro, Conn.	24.50	24.50	24.50	24.50	24.50	24.50
Copper, Lake delivered	24.625	24.625	24.625	24.625	24.625	24.625
Tin, Straits, New York	$1.215	$1.215	$1.215	.....	$1.215	$1.215
Zinc, East St. Louis	13.50	13.50	13.50	13.50	13.50	13.50
Lead, St. Louis	15.80	15.80	15.80	15.80	15.80	15.80

Note: Quotations are going prices.



Progress in Steel . . . *Means More Sheet and Strip*

The huge steel skeleton above is the beginning of one of several structures being built to house the new 66-inch Sheet-Strip Mills at the Pittsburgh Steel Company's Allenport Works. From these mills will come hot and cold rolled sheets to supply this vital material to manufacturers of a multitude of defense items and civilian goods.

The construction of these new mills is an important part of Pittsburgh Steel's Program of Progress which has as its objectives increases of 82% in finished product capacity and 50% in ingot capacity. It includes the acquisition of the Thomas Steel Company, now operating as the Thomas Strip Division, the installation of the new 66-inch High Lift Blooming-Slabbing Mill, which will roll slabs for the new Sheet-Strip Mill. Blast Furnace and Open Hearth capacities are also being greatly increased. All this is being done to expand production and diversify the Company's line of wire, tubular and flat-rolled products in order to serve customers better.

This Program of Progress at Pittsburgh Steel Company is typical of the activity in the steel industry which daily grows larger and stronger in order to help keep this Nation's commanding position in the world. For it is only with an adequate supply of steel that we can defend ourselves from aggression—maintain a high level of civilian economy as well.

Pittsburgh Steel Company

Pittsburgh, Pennsylvania

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Nonferrous Prices

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Sheet: 0.188 in., 2S, 3S, 31.6¢; 4S, 61S-O, 33.6¢; 52S, 35.8¢; 24S-O, 24S-OAL, 34.5¢; 75S-O, 75S-OAL, 41.9¢; 0.081 in., 2S, 3S, 32.8¢; 4S, 61S-O, 35.2¢; 52S, 37.4¢; 24S-O, 24S-OAL, 35.8¢; 75S-O, 75S-OAL, 43.9; 0.032 in., 2S, 3S, 34.5¢; 4S, 61S-O, 39.0¢; 52S, 41.8¢; 24S-O, 24S-OAL, 43.8¢; 75S-O, 75S-OAL, 54.8¢.

Plate ¼ in. and Heavier: 2S-F, 3S-F, 29.7¢; 4S-F, 31.7¢; 53S-F, 33.4¢; 61S-O, 32.3¢; 24S-O, 24S-OAL, 34.0¢; 75S-O, 75S-OAL, 40.7¢.

Extruded Solid Shapes: Shape factors 1 to 5, 35.5¢ to 77.2¢; 12 to 14, 36.2¢ to 93.5¢; 24 to 26, 38.7¢ to $1.22; 36 to 38, 45.9¢ to $1.79.

Rod, Rolled: 1.064 to 4.5 in., 2S-F, 3S-F, 39.4¢ to 35.2¢; cold-finished, 0.375 to 3 in., 2S-F, 3S-F, 42.5¢ to 36.8¢.

Screw Machine Stock: Rounds, 11S-Ts, ¼ to 11/32 in., 56.2¢ to 44.1¢; ⅝ to 1½ in., 43.6¢ to 41.0¢; 1 9/16 to 3 in., 40.4¢ to 37.8¢; 17S-Te, 1.6¢ per lb lower. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in., 2S, 41.5¢ to 30.5¢; 52S, 50.4 to 36.8¢; 56S, 53.6¢ to 44.1¢; 17S-T4, 56.7¢ to 39.4¢; 61S-T4, 50.9¢ to 38.9¢.

Extruded Tubing: Rounds, 63S-T5, OD in in.: 1¼ to 2, 38.9¢ to 56.7¢; 2 to 4, 35.2¢ to 47.8¢; 4 to 6, 35.7¢ to 43.6¢; 6 to 9, 36.2¢ to 45.7¢.

Roofing Sheet: Flat, 0.019 in. x 28 in., per sheet, 72 in., $1.199; 96 in., $1.598; 120 in., $1.997; 144 in., $2.398. 0.24 in. x 28 in., 72 in., $1.448; 96 in., $1.931; 120 in., $2.414; 144 in., $2.897. Coiled sheet: 0.019 in. x 28 in., 26.6¢ per lb: 0.024 in. x 28 in., 28.2 per lb.

Magnesium

(F.O.B. mill, freight allowed)

Sheet and Plate: FS1-O, ¼ in., 63¢; 3/16 in., 65¢; ⅛ in., 67¢; B & S Gage 10, 68¢; 12, 72¢. Specification grade higher. Base: 30,000 lb.

Extruded Round Rod: M, diam in., ¼ to 0.311 in., 74¢; ½ to ¾ in., 57.5¢; 1¼ to 1.749 in., 53¢; 2½ to 5 in., 48.5¢. Other alloys higher. Base up to ¾ in. diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangles: M. In weight per ft, for perimeters less than size indicated, 0.10 to 0.11 lb, 3.5 in., 62.3¢; 0.22 to 0.25 lb, 5.9 in., 59.3¢; 0.50 to 0.59 lb, 8.6 in., 56.7¢; 1.8 to 2.59 lb, 19.5 in., 53.8¢; 4 to 6 lb, 28 in., 49¢. Other alloys higher. Base, in weight per ft of shape: Up to ⅓ lb, 10,000 lb; ⅓ to 1.80 lb, 20,000 lb; 1.80 and heavier, 30,000 lb.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057; ¼ in. to 5/16, $1.40; 5/16 to ⅜, $1.26; ½ to ⅝, 98¢; 1 to 2 in., 76¢; 0.165 to 0.219, ⅝ to ¾, 61¢; 1 to 2 in., 57¢; 3 to 4 in., 56¢. Other alloys higher. Base, OD in in.: Up to 1½ in., 10,000 lb; 1½ in. to 3 in., 20,000 lb; 3 in. and larger, 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Commercially pure and alloy grades: Sheets and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $10; Bar, HR or forged, $6; Forgings, $6.

Nickel and Monel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel
Sheets, cold-rolled	77	60½
Strip, cold-rolled	83	63½
Rods and bars	73	58½
Angles, hot-rolled	73	58½
Plates	75	59½
Seamless tubes	106	93½
Shot and blocks	..	53½

Copper, Brass, Bronze

(Freight prepaid on 200 lb)

	Sheet	Rods	Extruded Shapes
Copper	45.52	....	45.12
Copper, h-r	....	41.37	....
Copper, drawn	....	42.62	....
Low brass	42.34	42.03	....
Yellow brass	40.17	39.86	....
Red brass	43.10	42.79	....
Naval brass	44.72	38.78	40.04
Leaded brass	....	....	38.02
Com'l bronze	44.39	44.08	....
Mang. bronze	43.44	42.83	43.89
Phos. bronze	64.72	64.97	....
Muntz metal	42.69	38.25	39.50
Ni silver, 10 pct	51.96	54.13	....

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	20.00
Aluminum pig	19.00
Antimony, American, Laredo, Tex.	49.00
Berryllium copper, 3.75-4.25% Be	$1.56
Beryllium aluminum 5% Be, Dollars per lb contained Be	$69.50
Bismuth, ton lots	$2.35
Cadmium, del'd	$2.00
Cobalt, 97-99% (per lb)	$2.40 to $2.47
Copper, electro, Conn. Valley	24.50
Copper, Lake, delivered	24.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$200
Lead, St. Louis	15.80
Lead, New York	16.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb.	24.50
Magnesium, sticks, 100 to 500 lb.	42.00 to 44.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$186 to $189
Nickel electro, f.o.b. N. Y. warehouse	59.58
Nickel oxide sinter, at Copper Creek, Ont., contained nickel	52.75
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$90 to $91
Silver, New York, cents per oz.	83.25
Tin, New York	$1.215
Titanium, sponge	$5.00
Zinc, East St. Louis	13.50
Zinc, New York	14.33
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb, delivered carloads)

85-5-5-5 ingot	
No. 115	27.25
No. 120	26.75
No. 123	26.25
80-10-10 ingot	
No. 305	33.00
No. 315	30.50
88-10-2 ingot	
No. 210	41.50
No. 215	40.00
No. 245	34.50
Yellow ingot	
No. 405	23.25
Manganese bronze	
No. 421	30.50

Aluminum Ingot

(Cents per lb, 10,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper, max.	20.6
0.60 copper, max.	20.4
Piston alloys (No. 122 type)	20.5
No. 12 alum. (No. 2 grade)	19.5
108 alloy	20.6
195 alloy	20.8
13 alloy (0.60 copper max.)	20.8
ASX-679	20.5
Steel deoxidizing aluminum, notch-bar granulated or shot	
Grade 1—95-97½%	18.80
Grade 2—92-95%	18.60
Grade 3—90-92%	18.40
Grade 4—85-90%	18.20

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	37.34
Electrodeposited	33⅜
Flat rolled	38.34
Forged ball anodes	43
Brass, 80-20	
Cast, oval, 15 in. or longer	34⅜
Zinc, oval	26½
Ball, anodes	25½
Nickel, 99 pct plus	
Cast	76.00
Rolled, depolarized	77.00
Cadmium	$2.15
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn.	97½

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum	63
Copper sulfate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed	20½
Nickel chloride, 375 lb drum	27½
Silver cyanide, 100 oz lots, per oz.	67¼
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drum	47.7

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add ⅛¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	21½	20½
Yellow brass	19⅛	17⅝
Red brass	20¼	19⅛
Comm. bronze	20¼	19⅛
Mang. bronze	18½	17½
Brass rod ends	18¾	....

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.25
No. 2 copper wire	17.75
Light copper	16.50
Refinery brass	17.25*
Radiators	14.75

* Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.25
No. 2 copper wire	17.75
Light copper	16.50
No. 1 composition	18.50
No. 1 comp. turnings	18.25
Rolled brass	18.50
Brass pipe	16.50
Radiators	14.75
Aluminum	
Mixed old cast	9 — 9¼
Mixed new clips	10 — 11
Mixed turnings, dry	9 — 9¼
Pots and pans	8½— 9

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass	
No. 1 heavy copper and wire	18¾—19¼
No. 2 heavy copper and wire	17 —17½
Light copper	15½—16
New type shell cuttings	15½—16
Auto radiators (unsweated)	14 —14½
No. 1 composition	17½—18
No. 1 composition turnings	17 —17½
Unlined red car boxes	16½—17
Cocks and faucets	15 —15½
Mixed heavy yellow brass	11½—13
Old rolled brass	14½—15
Brass pipe	15½—16
New soft brass clippings	16 —16½
Brass rod ends	15½—16
No. 1 brass rod turnings	15 —15½
Aluminum	
Alum. pistons and struts	6 — 6½
Aluminum crankcases	7 — 7½
2S aluminum clippings	10
Old sheet and utensils	7 — 7½
Borings and turnings	5 — 6
Misc. cast aluminum	7 — 7½
Dural clips (24S)	7 — 7½
Zinc	
New zinc clippings	7½— 8
Old zinc	5½— 6
Zinc routings	3 — 3½
Old die cast scrap	4½— 4¾
Nickel and Monel	
Pure nickel clippings	35 —36
Clean nickel turnings	35 —36
Nickel anodes	35 —36
Nickel rod ends	35 —36
New Monel clippings	28 —29
Clean Monel turnings	20 —21
Old sheet Monel	28 —29
Nickel silver clippings, mixed	13 —14
Nickel silver turnings, mixed	12 —13
Lead	
Soft scrap, lead	12 —12¼
Battery plates (dry)	7 — 7½
Batteries, acid free	4 — 5
Magnesium	
Segregated solids	15 —16
Castings	14 —15
Miscellaneous	
Block tin	100 —110
No. 1 pewter	70
No. 1 auto babbitt	55 —60
Mixed common babbitt	14½—14⅝
Solder joints	19 —20
Siphon tops	60
Small foundry type	19 —19½
Monotype	15½—16
Lino. and stereotype	13½—14
Electrotype	13 —13½
Hand picked type shells	9¾—10
Lino. and stereo. dross	7
Electro. dross	6¼

• NON-FERROUS METALS
• ORES AND MINERALS
• METALLIC RESIDUES
• METAL SCRAP
• FERRO ALLOYS
Phibro
MANGANESE ORE
CHROME ORE
TUNGSTEN ORE
Philipp Brothers, Inc.
NEW YORK 5, N. Y., Cables: PHIBRO, New York
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UNIVERSITY OF MICHIGAN LIBRARIES

Steelmaking Grades Strong at Ceiling

Some consumers soft-pedal buying as old orders are worked off . . . Pittsburgh market "dull" . . . Some dealer stockpiles considered slim . . . All the cast you want at right price.

Despite reluctance of some scrap consumers to enter wholehearted buying the scrap market generally displayed a strong front. Steelmaking grades were strong at ceiling prices. Blast furnaces grades were clambering back to ceiling.

In many dealers' yards inventories were considered slim. Scrap flow had not yet snapped back to full scale. This was contributing to the strength of the market. In several instances it was reported that foundries forced to enter the market on a short term basis could get all the cast they wanted. But it was at higher prices.

In Pittsburgh the market was reported "dull" with most consumers dodging new business as old orders were being worked off. A veteran scrap man told THE IRON AGE there was no doubt mills would be entering the market more heavily shortly and that ceiling prices on steelmaking and blast furnace grades would prevail.

In Chicago scrap collection was nothing to brag about but ceiling prices on steelmaking and blast furnaces grades remained undisturbed. There seemed to be much optimism floating around in scrap circles. Many saw a long uphill fight on scrap bound to evolve this winter.

Pittsburgh — Market is dull. Most mills are holding off on new business. Shipments continue on a restricted basis. One large consumer continues to accept material for laying down outside mill property. Ceiling prices prevail on everything except turnings and cast, although both these grades are stronger. On an average, inventories in dealers' yards are not high.

Chicago—Scrap here was going at ceiling in steel and blast furnace grades this week, with collections continuing rather poor. Cast had tightened considerably, with dealers seeming to feel that, although they did not yet have any high offers, these would be forthcoming soon and they would prefer to hold what they had. There were already reports of ceiling sales in some grades of cast scrap at press time, but were unconfirmed.

Philadelphia—Steel grades are firm at ceiling prices and cast items are climbing rapidly. A few mills in the district have restricted grades which they will accept. Some mills have also limited the truck shipments they will take but this is due to limitations in unloading facilities. Car wreckers expect to start cutting in September though some have already begun.

New York—Demand for steelmaking grades grows hot and heavy. Volume for blast furnace grades is respectable but not phenomenal. Cast is showing strength but shipments remain quiet. Some users of cast have entered the market. Low prices are being resisted. Old orders are still being worked off. Plenty of cast is available, dealers say, if the price is right.

Detroit—Dealers are emptying their yards at ceiling prices for steel grades in the post-strike activity. Accompanying the action in steel is some reluctance to part with cast at prices that are still below ceiling, with one exception. Clean automotive cast climbed to ceiling during the week. It was the last cast grade to drop below ceiling and the first to return. Dealers here do not expect generation of scrap in sizable amounts until later in August. It will be 30 days before a return to normal.

Cleveland — Market is strong but spotty. Ceiling prices prevail on openhearth grades, low phos, and railroad. Scrap is moving freely on old orders. Turnings were stronger. In the Valley, one consumer has held up shipments until a jam at mill receiving points is cleared up. Valley market was ceiling for the most part. Turnings were picking up strength.

St. Louis—Buying of scrap iron by steel mills is being held up until congestion caused by piling up of cars in yards during the steel strike is relieved. This may take from a week to 10 days. Movement from the country has been light. All prices are still at the ceiling except unstripped motor blocks.

Birmingham — Flurry in the cast steel market that for a few days sent No. 1 cupola cast to as high as $47 and $48 has subsided. Offerings have dropped back to $45. Shipment of openhearth grades ordered before the strike have about been completed. A few small orders have been placed at ceiling prices. The largest purchaser of blast furnace scrap has reduced its price on these grades $2 under ceiling for industrial scrap and $4 to dealers.

Cincinnati—Openhearth grades continue to bring ceiling prices. Demand was strong except for No. 2 bundles. With foundries picking up, the cast market was gaining strength. Dealer inventories were reported low. Trade looks for a strong market at least for the next 30 days.

West Coast—Dealers were waiting for the price of cast to go up. Foundries are taking all they can get because of the pig iron shortage but little is available. In Los Angeles the price rose to $50 delivered for No. 1 cupola cast and was expected to continue its climb. Steelmaking scrap is moving in quantity with producers reaching long distances and paying the freight. Freight bills of $8 or $9 from northern California to San Francisco and $10 or more from Arizona to Los Angeles were being paid.

Boston—Business improves steadily as shipments grew in volume. Yet a full scale rush has not developed. Blast furnace grades bounced back to ceilings. Mixed yard and heavy breakable cast stood at $38 to $39.

Buffalo — Strength swept through the scrap market. All prices except cast were at returning ceiling. Much firmer tone was evidenced despite the fact that mills were still confining their activities to accepting shipments on old orders. However, rapid rate of scrap usage and a shrinkage in new collections bolstered market sentiment. A limited order for borings and turnings was reported at ceiling.

Quantity PRODUCTION of GREY IRON CASTINGS

ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

ESTABLISHED 1866

THE WHELAND COMPANY

FOUNDRY DIVISION

MAIN OFFICE AND MANUFACTURING PLANTS

CHATTANOOGA 2, TENNESSEE

UNIVERSITY OF MICHIGAN LIBRARIES

Pittsburgh

No. 1 hvy. melting		$43.00*
No. 2 hvy. melting		43.00*
No. 1 bundles		44.00*
No. 2 bundles		43.00*
Machine shop turn.		32.00
Mixed bor. and ms. turns.		32.00
Shoveling turnings	$36.00 to	36.50
Cast iron borings	35.00 to	35.50
Low phos. punch'gs, plate		46.50*
No. 1 RR. hvy. melting		46.00*
Scrap rails, random lgth.		48.00*
Rails 2 ft and under		52.00*
RR. steel wheels		51.00*
RR. spring steel		51.00*
RR. couplers and knuckles		51.00*
No. 1 machinery cast.		52.00
Cupola cast.	47.50 to	48.00
Heavy breakable cast.		45.00
Malleable		55.00

Chicago

No. 1 hvy. melting		$41.50*
No. 2 hvy. melting		41.50*
No. 1 factory bundles		42.50*
No. 1 dealers' bundles		42.50*
No. 2 dealers' bundles		41.50*
Machine shop turn.		32.50*
Mixed bor. and turn.		36.50*
Shoveling turnings		36.50*
Cast iron borings		36.50*
Low phos. forge crops	$50.00 to	51.00
Low phos. punch'gs, plate		45.00*
Low phos. 3 ft and under	44.00 to	45.50
No. 1 RR. hvy. melting		44.50*
Scrap rails, random lgth.		46.50*
Rerolling rails		51.50*
Rails 2 ft and under		50.50*
Locomotive tires, cut		49.50*
Cut bolsters & side frames		47.50*
Angles and splice bars		49.50*
RR. steel car axles		56.50*
RR. couplers and knuckles		49.50*
No. 1 machinery cast.	47.50 to	48.50
Cupola cast.	45.00 to	46.00
Heavy breakable cast.	39.50 to	40.50
Cast iron brake shoes		41.00†
Cast iron car wheels		47.00†
Malleable	53.00 to	54.00
Stove plate	42.00 to	43.00

Philadelphia Area**

No. 1 hvy. melting		$41.50*
No. 2 hvy. melting		41.50*
No. 1 bundles		42.50*
No. 2 bundles		41.50*
Machine shop turn.		32.50*
Mixed bor. and turn.		36.50*
Shoveling turnings		36.50*
Clean cast chem. borings	$36.50 to	37.00
Low phos. punch'gs, plate		45.00*
Low phos. 3 ft and under		45.50*
Low phos. bundles		44.50*
Hvy. trimmings		41.50*
RR. steel wheels		49.50*
RR. spring steel		49.50*
Rails 18 in. and under		52.50*
Cupola cast.	46.00 to	49.00
Heavy breakable cast.	44.00 to	45.00
Cast iron carwheels		47.00†
Malleable		55.00†
Unstripped motor blocks	41.00 to	42.00
Drop broken mach'y cast.	49.00 to	51.00
Charging box cast.	45.00 to	46.00

Cleveland

No. 1 hvy. melting		$42.00*
No. 2 hvy. melting		42.00*
No. 1 busheling		43.00*
No. 1 bundles		43.00*
No. 2 bundles		42.00*
Machine shop turn.		30.00
Mixed bor. and turn.		30.00
Shoveling turnings	$34.00 to	34.50
Cast iron borings	34.00 to	34.50
Low phos. 2 ft and under		48.00*
No. 1 RR. hvy. melting		45.00*
Rails 3 ft and under		50.00*
Rails 18 in. and under		53.00*
No. 1 machinery cast.	48.50 to	49.50
Cast iron carwheels		47.00†
Stove plate	45.00 to	46.00
Malleable	51.00 to	52.00

Youngstown

No. 1 hvy. melting		$43.00*
No. 2 hvy. melting		43.00*
No. 1 bundles		44.00*
No. 2 bundles		43.00*
Machine shop turn.		31.00
Shoveling turnings	$35.00 to	35.50
Cast iron borings	35.00 to	35.50
Low phos. plate		46.50*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

*Scrap at basing point ceiling. Broker's fee not included.

†Scrap at shipping point ceiling. Broker's fee not included.

**Bethlehem and Sparrows Point steel grade ceilings are $.50 lower than Philadelphia Area.

Buffalo

No. 1 hvy. melting		$42.00*
No. 2 hvy. melting		42.00*
No. 1 bushelings		43.00*
No. 1 bundles		43.00*
No. 2 bundles		42.00*
Machine shop turn.		33.00*
Mixed bor. and turn.		37.00*
Shoveling turnings		37.00*
Cast iron borings		37.00*
Low phos. plate		45.50*
Scrap rails, random lgth.		47.00*
Rails 2 ft and under		51.00*
RR. steel wheels		50.00*
RR. spring steel		50.00*
RR. couplers and knuckles		50.00*
No. 1 machinery cast.	$46.00 to	47.00
No. 1 cupola cast.	44.00 to	45.00
Small indus. malleable		55.00†

Birmingham

No. 1 hvy. melting		$38.00*
No. 2 hvy. melting		38.00*
No. 1 bundles		39.00*
Electric furnace bundles		41.00*
No. 2 bundles		38.00*
No. 1 busheling		39.00*
Machine shop turn.		29.00*
Shoveling turnings	$29.00 to	31.00
Cast iron borings	29.00 to	31.00
Bar crops and plate		44.00*
Structural and plate, 2 ft.		44.00*
No. 1 RR. hvy. melting		41.00*
Scrap rails, random lgth.		43.00*
Rerolling rails		48.00*
Rails 2 ft and under		47.00*
Angles & splice bars		46.00*
Std. steel axles		53.00*
No. 1 cupola cast.	44.00 to	45.00
Stove plate	40.00 to	41.00
Cast iron carwheels		47.00†
Charging box cast.	39.00 to	40.00
Heavy breakable	37.00 to	38.00
Drop broken machinery	44.00 to	45.00
Unstripped motor blocks	37.00 to	38.00

St. Louis

No. 1 hvy. melting		$40.00*
No. 2 hvy. melting		40.00*
No. 2 bundled sheets		40.00*
Machine shop turn.		31.00*
Shoveling turnings		35.00*
Rails, random lengths		45.00*
Rails 3 ft and under		48.00*
Locomotive tires, uncut		45.00*
Angles and splice bars		48.00*
Std. steel car axles		55.00*
RR. spring steel		48.00*
Cupola cast.		49.00†
Hvy. breakable cast.		38.00
Cast iron brake shoes		41.00†
Stove plate		46.00†
Cast iron car wheels		47.00†
Malleable		55.00†
Unstripped motor blocks		35.00

New York

Brokers' Buying prices per gross ton, on cars:

No. 1 hvy. melting		$35.99*
No. 2 hvy. melting		35.99*
No. 2 bundles		35.99*
Machine shop turn.		26.99*
Mixed bor. and turn.		30.99*
Shoveling turnings		30.99*
Clean cast chem. borings	$30.00 to	30.50
No. 1 machinery cast	46.00 to	47.00
Mixed yard cast.	41.00 to	42.00
Charging box cast.	41.00 to	42.00
Heavy breakable cast.	40.00 to	41.00
Unstrp. motor blocks		37.00

Boston

Brokers' Buying prices per gross ton, on cars:

No. 1 hvy. melting		$33.17*
No. 2 hvy. melting		33.17*
No. 1 bundles		34.17*
No. 2 bundles		33.17*
No. 1 busheling		34.17*
Machine shop turn.		24.17*
Mixed bor. and short turn.		28.17*
Shoveling turnings		28.17*
Mixed cupola cast.	$38.00 to	38.17*
Heavy breakable cast.	38.00 to	39.00
Stove plate	33.00 to	34.00

Detroit

Brokers' Buying prices per gross ton, on cars:

No. 1 hvy. melting		$39.20*
No. 2 hvy. melting		39.20*
No. 1 bundles, openhearth		40.20*
No. 1 bundles, electric furnace		42.20*
New busheling		40.20*
Machine shop turn.		30.20*
Mixed bor. and turn.		34.20*
Shoveling turnings		34.20*
Cast iron borings		34.20*
Low phos. punch'gs, plate		42.70*
No. 1 cupola cast.	$47.00 to	48.00
Heavy breakable cast.	42.00 to	43.00
Stove plate		42.00
Automotive cast.		52.00†
Cast iron brake shoes		39.00

Cincinnati

No. 1 hvy. melting		$42.00*
No. 2 hvy. melting		42.00*
No. 1 bundles		43.00*
No. 2 bundles		42.00*
Machine shop turn.		32.00*
Mixed bor. and turn.		37.00*
Shoveling turnings		37.00*
Cast iron borings		37.00*
Low phos. plate		45.50*
Low phos. 2 ft and under		48.00*
Rails, random lengths		47.00*
Rails, 18 in. and under		53.00*
No. 1 cupola cast.	$48.00 to	49.00
Hvy. breakable cast.	41.00 to	42.00
Drop broken cast.	51.00 to	52.00

San Francisco

No. 1 hvy. melting		$34.00*
No. 2 hvy. melting		34.00*
No. 1 bundles		35.00*
No. 2 bundles		29.00
Machine shop turn.		30.00
Elec. fur. 1 ft and under		41.00*
No. 1 RR. hvy. melting		37.00*
Scrap rails random lgth.		39.00*
No. 1 cupola cast.		46.00

Los Angeles

No. 1 hvy. melting		$34.00*
No. 2 hvy. melting		34.00*
No. 1 bundles		35.00*
No. 2 bundles		29.00
Mach. shop turn.		30.00
Elec. fur. 1 ft and under.		41.00*
No. 1 RR. hvy. melting		37.00*
Scrap rails, random lgth.		39.00*
No. 1 cupola cast.		50.00

Seattle

No. 1 hvy. melting		$34.00*
No. 2 hvy. melting		34.00*
No. 1 bundles		35.00*
No. 2 bundles		29.00
Elec. fur. 1 ft and under		41.00*
No. 1 RR. hvy. melting		37.00*
No. 1 cupola cast.		40.50
Heavy breakable		35.50

Hamilton, Ont.

No. 1 hvy. melting		$35.00
No. 1 bundles		25.00
No. 2 bundles		24.50
Mechanical bundles		33.00
Mixed steel scrap		31.00
Mixed bor. and turn.		32.00
Rails, remelting		35.00
Rails, rerolling		33.00
Bushelings		30.00
Bush., new fact. prep'd.		33.00
Bush., new fact. unprep'd.		23.00
Short steel turnings		23.00
Cast scrap		50.00

SCRAP PRESCRIPTIONS EXPERTLY FILLED

Compounding Scrap Prescriptions for Mills & Foundries Since 1889

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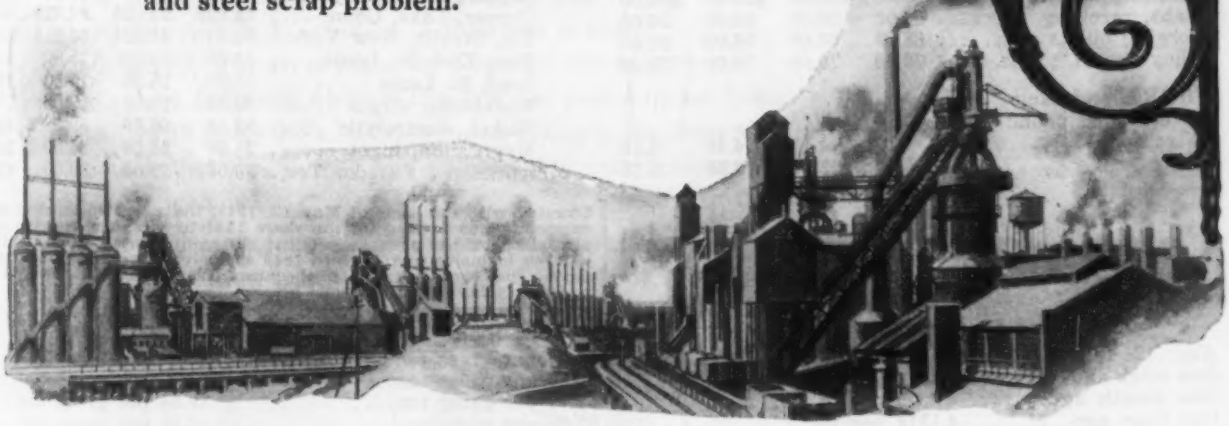
Our offices, strategically located at the very fingertips of the steel industry, are ready to assume your every iron and steel scrap problem.



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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

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Comparison of Prices

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel: (cents per pound)	Aug. 12, 1952	Aug. 5, 1952	July 15, 1952	Aug. 14, 1951
Hot-rolled sheets	3.60	3.60	3.60	3.60
Cold-rolled sheets	4.35	4.35	4.35	4.35
Galvanized sheets (10 ga)	4.80	4.80	4.80	4.80
Hot-rolled strip	3.50	3.50	3.50	3.50
Cold-rolled strip	4.75	4.75	4.75	4.75
Plate	3.70	3.70	3.70	3.70
Plates wrought iron	.7.85	7.85	7.85	7.85
Stains C-R strip (No. 302)	36.75	36.75	36.75	36.75
Tin and Terneplate: (dollars per base box)				
Tinplate (1.50 lb.) cokes	$8.70	$8.70	$8.70	$8.70
Tinplate, electro (0.50 lb.)	7.40	7.40	7.40	7.40
Special coated mfg. ternes	7.50	7.50	7.50	7.50
Bars and Shapes: (cents per pound)				
Merchant bars	3.70	3.70	3.70	3.70
Cold finished bars	4.55	4.55	4.55	4.55
Alloy bars	4.30	4.30	4.30	4.30
Structural shapes	3.65	3.65	3.65	3.65
Stainless bars (No. 302)	31.50	31.50	31.50	31.50
Wrought iron bars	9.50	9.50	9.50	9.50
Wire (cents per pound)				
Bright wire	4.85	4.85	4.85	4.85
Rails (dollars per 100 lb)				
Heavy rails	$3.60	$3.60	$3.60	$3.60
Light rails	4.00	4.00	4.00	4.00
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$56.00	$56.00	$56.00	$56.00
Slabs, rerolling	56.00	56.00	56.00	56.00
Forging billets	66.00	66.00	66.00	66.00
Alloy blooms, billets, slabs	70.00	70.00	70.00	70.00
Wire Rod and Skelp: (cents per pound)				
Wire rods	4.10	4.10	4.10	4.10
Skelp	3.35	3.35	3.35	3.35

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

Pig Iron: (per gross ton)	Aug. 12, 1952	Aug. 5, 1952	July 15, 1952	Aug. 14, 1951
Foundry, del'd Phila.	$58.19	$58.19	$58.19	$57.77
Foundry, Valley	52.50	52.50	52.50	52.50
Foundry, Southern, Cin'ti	55.58	55.58	55.58	55.58
Foundry, Birmingham	48.88	48.88	48.88	48.88
Foundry, Chicago†	52.50	52.50	52.50	52.50
Basic, del'd Philadelphia	57.27	57.27	57.27	56.92
Basic, Valley furnace	52.00	52.00	52.00	52.00
Malleable, Chicago†	52.50	52.50	52.50	52.50
Malleable, Valley	52.50	52.50	52.50	52.50
Charcoal, Chicago	70.56	70.56	70.56	70.56
Ferromanganese‡	226.25	186.25	186.25	186.25

†The switching charges for delivery to foundries in the Chicago district is $1 per ton.
‡Average of U. S. prices quoted on Ferroalloy pages.

Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$43.00*	$43.00*	$39.50	$44.00*
No. 1 steel, Phila. area	41.50*	41.50*	40.50	42.50*
No. 1 steel, Chicago	41.50*	41.50*	38.00	42.50*
No. 1 bundles, Detroit	41.15*	41.15*	41.15*	41.15*
Low phos. Young'n	46.50*	46.50*	46.50*	46.50*
No. 1 cast, Pittsburgh	46.75	46.75	42.00	49.00†
No. 1 cast, Philadelphia	47.50	45.50	38.50	49.00†
No. 1 cast, Chicago	45.50	44.50	39.50	49.00†

*Basing pt., not including broker's fee.
†Shipping pt., not including broker's fee.

Coke: Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75	$14.75	$14.75	$14.75
Foundry coke, prompt	17.75	17.75	17.75	17.75

Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro, Conn.	24.50	24.50	24.50	24.50
Copper, Lake, Conn.	24.625	24.625	24.625	24.625
Tin, Straits, New York	$1.215	$1.215	$1.215	$1.03
Zinc, East St. Louis	*13.50*	15.00	15.00	17.50
Lead, St. Louis	15.80	15.80	15.80	16.80
Aluminum, virgin	20.00	19.00	19.00	19.00
Nickel, electrolytic	59.58	59.58	59.58	59.58
Magnesium, ingot	24.50	24.50	24.50	24.50
Antimony, Laredo, Tex.	39.00	39.00	39.00	42.00

Composite Prices

Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 139 of May 12, 1949, issue.)

	Finished Steel Base Price	Pig Iron	Scrap Steel
Aug. 12, 1952	4.131¢ per lb.	$52.77 per gross ton	$42.00 per gross ton
One week ago	4.131¢ per lb.	52.77 per gross ton	42.00 per gross ton
One month ago	4.131¢ per lb.	52.77 per gross ton	39.33 per gross ton
One year ago	4.131¢ per lb.	52.69 per gross ton	43.00 per gross ton

	Finished Steel Base Price High		Finished Steel Base Price Low		Pig Iron High		Pig Iron Low		Scrap Steel High		Scrap Steel Low	
1952	4.131¢	Jan. 1	4.131¢	Jan. 1	$52.77	May 2	$52.72	Jan. 1	$42.00	Jan. 1	$39.17	July 1
1951	4.131¢	Jan. 2	4.131¢	Jan. 2	52.72	Oct. 9	52.69	Jan. 2	47.75	Jan. 30	42.00	Oct. 23
1950	4.131¢	Dec. 1	3.837¢	Jan. 3	52.69	Dec. 12	45.88	Jan. 3	45.13	Dec. 19	26.25	Jan. 3
1949	3.837¢	Dec. 27	3.705¢	May 3	46.87	Jan. 18	45.88	Sept. 6	43.00	Jan. 4	19.33	June 28
1948	3.721¢	July 27	3.193¢	Jan. 1	46.91	Oct. 12	39.58	Jan. 6	43.16	July 27	39.75	Mar. 9
1947	3.193¢	July 29	2.848¢	Jan. 1	37.98	Dec. 30	30.14	Jan. 7	42.58	Oct. 28	29.50	May 20
1946	2.848¢	Dec. 31	2.464¢	Jan. 1	30.14	Dec. 10	25.37	Jan. 1	31.17	Dec. 24	19.17	Jan. 1
1945	2.464¢	May 29	2.396¢	Jan. 1	25.37	Oct. 23	23.61	Jan. 2	19.17	Jan. 2	18.92	May 22
1944	2.396¢		2.396¢		$23.61		$23.61		19.17	Jan. 11	15.76	Oct. 24
1943	2.396¢		2.396¢		23.61		23.61		$19.17		$19.17	
1942	2.396¢		2.396¢		23.61		23.61		19.17		19.17	
1941	2.396¢		2.396¢		$23.61	Mar. 20	$23.45	Jan. 2	$22.00	Jan. 7	$18.92	May 22
1940	2.30467¢	Jan. 2	2.24107¢	Apr. 16	23.45	Dec. 23	22.61	Jan. 2	21.83	Dec. 30	16.04	Apr. 9
1939	2.35367¢	Jan. 3	2.27207¢	May 16	22.61	Sept. 19	20.61	Sept. 12	22.50	Oct. 3	14.08	May 16
1938	2.58414¢	Jan. 4	2.27207¢	Oct. 18	23.25	June 21	19.61	July 6	15.00	Nov. 22	11.00	June 7
1937	2.58414¢	Mar. 9	2.32263¢	Jan. 4	32.25	Mar. 9	20.25	Feb. 16	21.92	Mar. 30	12.67	June 9
1936	2.32263¢	Dec. 28	2.05200¢	Mar. 10	19.74	Nov. 24	18.73	Aug. 11	17.75	Dec. 21	12.67	June 8
1929	2.31773¢	May 28	2.26498¢	Oct. 29	18.71	May 14	18.21	Dec. 17	17.58	Jan. 29	14.08	Dec. 8

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strips, representing major portion of finished steel shipment. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

YOU MAY save 3.15 POUNDS PER SHEET*

WITH

MicroRold®

STAINLESS STEEL

When you order sheet by gauge number the permissible A. I. S. I. variation in thickness is plus or minus 10%. Thusly, if you order 18 gauge, you may receive a sheet .052 thick when .0475 would suit your purpose. Using a standard 18 gauge 36"x120" sheet as an example, the theoretical weight is 63 pounds, but this weight could permissibly vary between 65.52 pounds and 59.22 pounds.

A sheet of MicroRold .0475 thick with a tolerance of only 3% would weigh 59.85 pounds thus insuring a saving of 3.15 pounds from the theoretical average-weight, or 5.67 pounds from the maximum, while still remaining within the 18 gauge ordering range.

Weight of One Sheet of 18 Gauge 36" x 120" Plus or Minus 10%

.052"—65.52 Pounds .051"—64.26 Pounds .050"—63.00 Pounds .049"—61.74 Pounds .048"—60.48 Pounds .047"—59.22 Pounds	Theoretical Wt. 63.00 Pounds

Weight of the same size sheet of .0475 plus or minus 3% is 59.85 pounds with an average saving of 3.15 pounds per sheet.

Multiply this saving by the number of sheets you use per month and the price per pound and you have a good dollar and cents reason for buying MicroRold.

** Each additional 1/1000" of thickness adds 1.26 pounds weight per sheet.*

WASHINGTON STEEL CORPORATION

WASHINGTON, PENNSYLVANIA

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STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply. New prices, effective July 26, will be billed later. Prices are approximately 4.7 pct higher than shown.

		INGOTS		BILLETS, BLOOMS, SLABS			PIPE SKELP	PILING	SHAPES STRUCTURALS		STRIP			
		Carbon Forging Net Ton	Alloy Net Ton	Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton		Steel Sheet	Carbon	Hi Str. Low Alloy	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy
EAST	Bethlehem, Pa.					$70.00 *B3*			3.70 *B3*	5.50 *B3*				
	Buffalo, N. Y.			$56.00 *B3*	$66.00 *B3, R3*	$70.00 *B3, R3*		4.45 *B3*	3.70 *B3*	5.50 *B3*	3.50 *B3, R3*	4.65 *B3*	4.95 *B3*	6.40 *B3*
	Claymont, Del.													
	Contesville, Pa.													
	Conshohocken, Pa.				$73.00 *A2*	$77.00 *A2*					3.90 *A2*		5.55 *A2*	
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.			$56.00 *B3*	$66.00 *B3*	$70.00 *B3*			3.70 *B3*	5.50 *B3*	3.50 *B3*			
	Newark, N. J.													
	New Haven, Conn.											5.15 *A5* 5.85 *D1*		
	Phoenixville, Pa.								5.00 *P2*					
	Putnam, Conn.													
	Sparrows Pt., Md.										3.50 *B3*	4.65 *B3*	4.95 *A5, B3*	6.40 *B3*
	Worcester, Mass.													
	Trenton, N. J.											6.00 *R4*		
MIDDLE WEST	Alton, Ill.										3.95 *L1*			
	Ashland, Ky.										3.50 *A7*			
	Canton-Massillon; Ohio				$66.00 *R3*	$70.00 *R3* $66.00 *T5*								
	Chicago, Ill.			$56.00 *U1*	$66.00 *U1, R3,W8*	$70.00 *U1, R3,W8*		4.45 *U1*	3.65 *U1, W8*	5.50 *U1*	3.50 *A1, W8*	4.90 *A1, I3*		
	Cleveland, Ohio				$66.00 *R3*							4.65 *A5,J3*		6.55 *A5* 6.70 *J3*
	Detroit, Mich.		$54.00 *R5*		$69.00 *R5*	$73.00 *R5*					4.40 *M2* 3.80 *G3*	4.85 *G3* 5.45 *M2* 5.60 *R5,D1, D2*	5.95 *G3*	
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana			$56.00 *U1*	$66.00 *U1*	$70.00 *U1, Y1*		4.45 *I3*	3.65 *U1, I3*	5.50 *U1, I3* 6.00 *Y1*	3.50 *U1, Y1,I3*	4.90 *I3*	5.30 *U1, I3* 5.90 *Y1*	
	Granite City, Ill.													
	Kokomo, Ind.													
	Middletown Ohio											4.65 *A7*		
	Niles, Ohio Sharon, Pa.										4.00 *S1*	5.35 *S1*	5.40 *S1*	6.55 *S1*
	Pittsburgh, Pa.	$52.00 *U1*	$54.00 *U1, C11*	$56.00 *U1*	$66.00 *U1*	$70.00 *U1, C11*	3.35 *U1* 3.45 *J3*	4.45 *U1*	3.65 *U1, J3*	5.50 *U1, J3*	4.00 *S9,S7* 3.75 *A3* 3.50 *J3,A7*	4.65 *J3,A7* 5.00 *A3* 5.35 *B4,S7*		
	Portsmouth, Ohio													
	Weirton, Wheeling, Follansbee, W. Va.								3.90 *W3*		3.60 *W3*	4.65 *W3,F3*	5.75 *W3*	7.20 *W3*
	Youngstown, Ohio					$70.00 *Y1, C10*	3.35 *U1, R3*			6.00 *Y1*	3.50 *U1, R3, Y1*	4.65 *R3, Y1* 5.25 *C5,T4* 5.35 *B4*	5.30 *U1, R3* 5.50 *Y1*	6.55 *R3* 7.05 *Y1*
WEST	Fontana, Cal.	$79.00 *K1*	$80.00 *K1*	$75.00 *K1*	$85.00 *K1*	$89.00 *K1*			4.25 *K1*	6.10 *K1*	4.75 *K1*	6.30 *K1*	6.20 *K1*	6.95 *K1*
	Geneva, Utah				$66.00 *C7*				3.65 *C7*	5.50 *C7*				
	Kansas City, Mo.								4.25 *S2*		4.10 *S2*			
	Los Angeles, Calif.				$85.00 *B2*	$90.00 *B2*			4.25 *B2, C7*	6.05 *B2*	4.25 *B2,C7*	6.40 *C1*	6.05 *B2*	
	Minnequa, Colo.								4.10 *C6*		4.55 *C6*			
	San Francisco, Cal. Niles, Cal.				$85.00 *B2*				4.20 *B2* 4.56 *P9*	6.00 *B2*	4.25 *C7,B2*		6.05 *B2*	
	Seattle, Wash.	$73.00 *S11*			$85.00 *B2*				4.30 *B2*	6.10 *B2*	4.50 *B2*		6.30 *B2*	
SOUTH	Atlanta, Ga.										4.05 *A8*			
	Birmingham, Ala. Alabama City, Ala.			$56.00 *T2*	$66.00 *T2*				3.65 *R3,T2*	5.50 *T2*	3.50 *R3,T2*		5.30 *T2*	
	Houston, Texas		$62.00 *S2*		$74.00 *S2*	$78.00 *S2*			4.05 *S2*		3.90 *S2*			

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SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE	
Hot-rolled 18 ga. & heav.	Cold-rolled	Galvanized 10 ga.	Enameling 12 ga.	Long Terne 16 ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled 19 ga.		Cokes* 1.25-lb. base box	Electro* 0.25-lb. base box	Hollowware Enameling 29 ga.	
													Bethlehem, Pa.
B3	4.35 *B3*				5.40 *B3*	6.55 *B3*			4.10 *W6*				Buffalo, N. Y.
										† Special coated mfg ternes deduct 95¢ from 1.25-lb coke base box price. Can-making quality blackplate 55 to 128 lb, deduct $2.20 from 1.25-lb coke base box. * COKES: 1.50-lb, add 25¢. ELECTRO: 0.50-lb, add 25¢; 0.75-lb, add 65¢.			Claymont, Del.
													Coatesville, Pa.
A2					5.65 *A2*								Conshohocken, Pa.
													Harrisburg, Pa.
													Hartford, Conn.
									4.10 *B3*				Johnstown, Pa.
													Newark, N. J.
													New Haven, Conn.
													Phoenixville, Pa.
													Putnam, Conn.
B3	4.35 *B3*	4.80 *B3*			5.40 *B3*	6.55 *B3*	6.75 *B3*		4.20 *B3*	$8.55 *B3*	$7.25 *B3*		Sparrows Pt., Md.
									4.40 *A5*				Worcester, Mass.
									4.20 *R4*				Trenton, N. J.
									4.40 *L1*				Alton, Ill.
A7		4.80 *A7*	4.65 *A7*										Ashland, Ky.
		4.80 *R3*											Canton-Massillon, Ohio
W8					5.40 *U1*				4.10 *A5,R3, N4*				Chicago, Ill.
R3,J3	4.35 *R3,J3*		4.65 *R3*		5.40 *R3,J3*	6.55 *R3,J3*			4.10 *A5*				Cleveland, Ohio
G3 *M3*	4.55 *G3*				5.95 *G3*	7.10 *G3*							Detroit, Mich.
													Duluth, Minn.
U1, Y1,I3	4.35 *U1, Y1,I3*	4.80 *U1,I3*	4.65 *U1,I3*	5.20 *U1*	5.40 *U1,I3* 5.90 *Y1*	6.55 *U1,I3* 7.05 *Y1*		5.40 *I3*	4.10 *Y1*	$8.45 *I3, U1, Y1*	$7.15 *U1,I3*	5.85 *U1* 5.30 *Y1*	Gary, Ind. Harbor, Indiana
G2	5.05 *G2*	5.50 *G2*	5.35 *G2*								$7.35 *G2*	6.05 *G2*	Granite City, Ill.
		5.20 *C9*											Kokomo, Ind.
	4.35 *A7*		4.65 *A7*	5.20 *A7*									Middletown, Ohio
N3 *S1*		6.00 *N3*		6.00 *N3*	5.40 *S1*								Niles, Ohio Sharon, Pa.
U1, J3,A7 *A3*	4.35 *U1, J3,A7*	4.80 *U1*	4.65 *U1*		5.40 *U1,J3*	6.55 *U1,J3*	7.20 *U1*		4.10 *A5* 4.30 *P6*	$8.45 *U1,J3*	$7.15 *U1,J3*	5.85 *U1*	Pittsburgh, Pa.
									4.30 *P7*				Portsmouth, Ohio
W3,W5	5.35 *F3* 4.35*W3,W5*	4.80*W3,W5*		5.20*W3,W5*	5.75 *W3*	6.90 *W3*				$8.45*W3,W5*	$7.15*W3,W5*	6.15 *W5* 5.85 *F3*	Weirton, Wheeling, Follansbee, W. Va.
U1, R3, Y1	4.35 *R3, Y1*	5.50 *R1*	4.65 *Y1*	6.05 *E2*	5.40 *U1,R3* 5.90 *Y1*	6.55 *R3* 7.05 *Y1*		6.05 *R1,E2*	4.10 *Y1*	$8.45 *R3*	$7.15 *R3*		Youngstown, Ohio
K1	5.30 *K1*				6.35 *K1*	7.50 *K1*			4.90 *K1*				Fontana, Cal.
C7													Geneva, Utah
													Kansas City, Mo.
C7		5.55 *C7*						5.40 *C7*	4.90 *B2,C7*	$9.20 *C7*	$7.90 *C7*		Los Angeles, Cal.
									4.35 *C6*				Minnequa, Colo.
C7	5.30 *C7*	5.55 *C7*											San Francisco, Cal. Niles, Cal.
													Seattle, Wash.
													Atlanta, Ga.
R3,T2	4.35 *T2*	4.80 *R3,T2*			5.40 *T2*			4.75 *R3*	4.10 *R3,T2*	$8.55 *T2*	$7.25 *T2*		Birmingham, Ala. Alabama City, Ala.
									4.50 *S2*				Houston, Texas

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		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfg's. Bright
EAST	Bethlehem, Pa.				4.30 *B3*	5.40 *B3*	5.55 *B3*					
	Buffalo, N. Y.	3.70 *B3,R3*	3.70 *B3,R3*	4.60 *B5*	4.40 *B3,R3*	5.40 *B3*	5.55 *B3*	3.70 *B3*				4.85 *W6*
	Claymont, Del.							4.15 *C4*		4.85 *C4*		
	Coatesville, Pa.							4.15 *L4*		5.25 *L4*		
	Conshohocken, Pa.							4.15 *A2*	4.75 *A2*	5.05 *A2*	5.90 *A2*	
	Harrisburg, Pa.							6.30 *C3*	6.30 *C3*			
	Hartford, Conn.			5.10 *R3*		5.85 *R3*						
	Johnstown, Pa.	3.70 *B3*	3.70 *B3*		4.30 *B3*		5.55 *B3*	3.70 *B3*		4.75 *B3*	5.65 *B3*	4.85 *B3*
	Newark, N. J.			5.00 *W10*		5.75 *W10*						
	New Haven, Conn.											
	Phoenixville, Pa.											
	Putnam, Conn.			5.10 *W10*								
	Sparrows Point, Md.		3.70 *B3*					3.70 *B3*		4.75 *B3*	5.65 *B3*	4.95 *B3*
	Worcester, Mass.					5.75 *A5*						5.15 *A5,W6*
	Trenton, N. J.											
MIDDLE WEST	Alton Ill.	4.15 *L1*										5.05 *L1*
	Ashland, Ky.							3.70 *A7*				
	Canton-Massillon	3.70 *R3*		4.55 *R3,R2*	3.95 *T5* 4.30 *R3*	4.90 *T5* 5.40 *R3,R2*						
	Chicago, Ill.	3.70 *U1,R3, W8*	3.70 *R3*	4.55 *A5,B5, W8,W1*	4.30 *U1,R3 W8*	5.40 *R3,W8 W10,B5,L2* 5.45 *A5*		3.70 *U1,W8*	4.75 *U1*	4.75 *U1*	5.65 *U1*	5.10 *W7* 4.85 *R3,A5, K2,N4*
	Cleveland, Ohio	3.70 *R3*	3.70 *R3*	4.55 *A5,C13*		5.45 *A5*	5.55 *R3,J3*	3.70 *R3,J3*	4.75 *J3*		5.65 *R3,J3*	4.85 *A5,C13*
	Detroit, Mich.	3.85 *R5*		4.70 *P8,R5* 4.80 *P3*	4.45 *R5* 4.65 *G3*	5.50 *R5* 5.55 *P8* 5.60 *P3*						
	Duluth, Minn.											4.85 *A5*
	Gary, Ind. Harbor, Indiana	3.70 *U1, Y1, I3*	3.70 *U1,I3, Y1*	4.55 *R3,M5, L2*	4.30 *U1,I3, Y1*	5.40 *R3,M5, L2*	5.55 *U1,I3* 6.05 *Y1*	3.70 *U1,I3, Y1*	4.75 *I3*	4.75 *U1*	5.65 *U1,I3* 6.15 *Y1*	5.10 *M4*
	Granite City, Ill.							4.40 *G2*				
	Kokomo, Ind.											4.95 *C9*
	Middletown, Ohio											
	Niles, Ohio Sharon, Pa.							3.95 *S1*		5.20 *S1*	5.70 *S1*	
	Pittsburgh, Pa.	3.70 *U1,J3*	3.70 *U1,J3*	4.55 *R3,A5, J3,S8,W10, C8*	4.30 *U1,C11*	5.40 *C11,S8, W10,C8,A5*	5.55 *U1,J3*	3.70 *U1,J3*	4.75 *U1*	4.75 *U1*	5.45 *U1,J3*	4.85 *A5,J3* 5.10 *P6*
	Portsmouth, Ohio											5.25 *P7*
	Weirton, Wheeling, Follansbee, W. Va.	3.85 *W3*						4.00 *W3,W5*				
	Youngstown, Ohio	3.70 *U1,R3, Y1*	3.70 *U1,R3, Y1*	4.55 *Y1,F2*	4.30 *U1, Y1, C10*	5.40 *Y1,C10, F2*	5.55 *U1* 6.05 *Y1*	3.70 *U1,R3, Y1*			5.65 *R3* 6.15 *Y1*	4.85 *Y1*
WEST	Fontana, Cal.	4.40 *K1*	4.40 *K1*		5.35 *K1*		6.60 *K1*	4.30 *K1*		5.70 *K1*	6.25 *K1*	
	Geneva, Utah							3.70 *C7*			5.65 *C7*	
	Kansas City, Mo.	4.30 *S2*	4.30 *S2*		4.90 *S2*							5.45 *S2*
	Los Angeles, Cal.	4.40 *C7,B2*	4.40 *C7,B2*		5.35 *B2*		6.25 *B2*					5.80 *C7,B2*
	Minnequa, Colo.	4.15 *C6*	4.50 *C6*					4.50 *C6*				5.10 *C6*
	San Francisco, Cal. Niles Cal.	4.45 *B2* 4.40 *C7* 4.65 *P9*	4.45 *B2* 4.40 *C7* 4.65 *P9*				6.30 *B2*					5.80 *C7*
	Seattle, Wash.	4.45 *B2*	4.45 *B2*				6.30 *B2*	4.60 *B2*			6.55 *B2*	
SOUTH	Atlanta, Ga.	4.25 *A8*	4.25 *A8*									5.10 *A8*
	Birmingham, Ala. Alabama City. Ala.	3.70 *R3,T2*	3.70 *R3,T2*				5.55 *T2*	3.70 *R3,T2*			5.65 *T2*	4.85 *R3,T2*
	Houston, Tex.	4.10 *S2*	4.10 *S2*		4.70 *S2*			4.10 *S2*				5.25 *S2*

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, O.
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Co., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin Inc., Harvey, Ill.

C1 California Cold Rolled Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Steel Corp., Claymont, Del.
C5 Cold Metal Products Co., Youngstown
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia-Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Glassport, Pa.
C11 Crucible Steel Co. of America, New York
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G1 Globe Iron Co., Jackson, O.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago

K1 Kaiser Corp., Oakland, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.

L1 Lackede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLauth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Co., Inc., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.

N1 National Supply Co., Pittsburgh
N2 National Tube Co., Pittsburgh
N3 Niles Rolling Mills Co., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.

O1 Oliver Iron & Steel Co., Pittsburgh

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div. Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co. (John A.), Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw & Steel Co., Fitchburg, Mass.
S5 Sloss Sheffield Steel & Iron Co., Birmingham
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Sweet's Steel Co., Williamsport, Pa.
S11 Seidelhuber Steel Rolling Mills, Seattle

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal, Iron & R. R. Co., Birmingham
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Steel Co., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T6 Tremont Nail Co., Wareham, Mass.

U1 United States Steel Co., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Co., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh

Y1 Youngstown Sheet & Tube Co., Youngstown

Steel Prices

Base price, f.o.b., dollars per 100 lb.

WAREHOUSES		Sheets			Strip		Plates	Shapes	Bars		Alloy Bars			
Cities	Delivery Charge*	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled A 4615 As rolled	Hot-Rolled A 4140 Annealed	Cold-Drawn A 4615 As Rolled	Cold-Drawn A 4140 Annealed
Baltimore	$.20	5.54-6.44	6.84-7.05	8.02	6.07	.....	6.17	6.17	6.05	6.67	.....	.....	.....	.....
Birmingham	.15	5.59	6.37	7.20-7.35†	5.54	.....	5.85	5.70	5.52	7.60	.....	.....	.....	.....
Boston	.20	6.25	7.03	8.19-8.28	6.20	7.74-8.70	6.38-6.63	6.25	6.18-6.14	6.64-6.92	10.25-10.30	10.55-10.63	11.95	12.15-12.28
Buffalo	.20	5.50-5.54	6.28-6.32	8.06-8.20	5.86	.....	5.89-5.98	5.80-5.82	5.52-5.55	6.18-6.45	10.15	10.45-10.52	11.80	12.10-12.17
Chicago	.20	5.54	6.32	7.65	5.49	.....	5.65-5.70	5.65	5.47	6.05-6.30	.....	10.10	.....	11.75
Cincinnati	.15	5.87	6.39	8.12	5.79	.....	6.17	6.12	5.77	6.66	.....	10.52	.....	12.22
Cleveland	.20	5.52-5.54	6.32	7.76-7.79	5.65-5.88	.....	5.82	5.95-6.16	5.61-5.62	6.15-6.40	.....	10.21	.....	11.86
Detroit	.20	5.73-5.74	6.49	7.96-8.19	5.78	.....	6.04-6.17	6.12	5.76	6.60	.....	10.37	.....	12.12
Houston	.20	6.35-6.56	7.37-8.09	8.57	6.15	.....	6.30-6.42	6.32-6.35	6.38	8.38-8.63	10.95	11.12-11.25	11.40	12.62-12.90
Indianapolis	del'd.	5.94	6.72	8.25	5.89	.....	6.10	6.05	5.87	6.80	.....	10.50	.....	.....
Kansas City	.20	6.22-6.40	7.04-7.68	8.66-8.70	6.10-6.90	7.81	6.35-6.74	6.43-6.48	6.20-6.77	7.01-7.22	10.00	10.10	11.50	11.80
Los Angeles	.20	6.35	8.15-8.45	9.25-10.20	6.40	10.45	6.50	6.30	6.25-6.35	8.15	11.30	11.60	13.05	13.80
Memphis	.10	6.25	7.03	7.51	6.20	.....	6.36	6.36-6.61	6.33-6.57	7.11	.....	.....	.....	.....
Milwaukee	.20	5.71	6.48	7.81-7.82	5.66	.....	5.81-5.87	5.82	5.64	6.31-6.57	.....	10.17	.....	.....
New Orleans	.15	5.98	7.01	8.26	5.93	.....	6.09	6.09	5.91	7.02	.....	.....	.....	.....
New York	.30	6.00-6.52	6.90-7.06	8.07-8.28	6.36-7.19	7.67	6.47-6.88	6.39-6.40	6.22-6.42	7.03-7.58	10.45	10.49-10.75	12.10	12.14-12.40
Norfolk	.20	6.68	.....	.....	6.33	.....	6.20	6.20	5.95	7.30	.....	.....	.....	.....
Philadelphia	.25	5.84-6.07	6.80-7.22	7.95-8.00	6.04-6.08	7.15	6.05-6.19	5.86-6.09	6.14-6.27	6.96-7.16	9.82-10.17	10.24-10.47	11.82	11.89-12.12
Pittsburgh	.20	5.54	6.32	7.65-8.05	5.59-5.62	.....	5.65-5.70	5.65	5.47	6.15-6.40	.....	10.10	.....	11.75
Portland	.20	7.25	8.64-9.00	9.10-9.25	7.30	.....	6.76	7.96	7.00	8.65	.....	.....	.....	.....
Salt Lake City	.20	7.95	.....	9.80-10.35	8.00	.....	7.45	7.60	7.95	.....	.....	.....	.....	.....
San Francisco	.15	6.51-6.64	7.88-8.23	9.15-10.20	6.60-6.72	10.45	6.49-6.75	6.42-6.50	6.32-6.52	8.15-8.20	11.30	11.30	13.05	13.50
Seattle	.20	6.96-7.16	8.38-8.98	9.45	7.25-7.55	.....	6.74-6.89	6.32-6.52	6.88-7.08	8.86-8.91	.....	.....	.....	.....
St. Louis	.20	5.84	6.62-7.15	7.95	5.79	7.66-8.15	6.05-6.10	6.05-6.22	5.77-5.80	6.45-6.70	10.08	10.40	11.73	12.05
St. Paul	.15	6.14	6.92	8.31	6.09	.....	6.25	6.25	6.07	6.75	.....	.....	.....	.....

* Metropolitan area delivery.

BASE QUANTITIES (Standard unless otherwise keyed): Cold finished bars; 2000 lb or over. Alloy bars; 1000 to 1999 lb. All others; 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets, for quantity.

EXCEPTIONS: (†) 500 to 1499 lb.

STAINLESS STEELS

Base price, cents per lb, f.o.b. mill.

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	14.25	15.25	16.75	16.25	24.75	20.00	21.75	12.75	14.75	13.00
Slabs, billets, rerolling	18.50	20.00	22.00	21.00	32.25	26.25	28.50	16.50	20.00	16.75
Forg. discs. die blocks, rings	34.00	34.25	36.75	35.75	53.00	40.25	44.75	28.00	28.50	28.50
Billets, forging	26.25	26.50	28.50	27.75	41.50	31.25	35.00	21.50	22.00	22.00
Bars, wires, structurals	31.25	31.50	34.00	33.00	49.25	37.00	41.50	25.75	26.25	26.25
Plates	33.00	33.25	35.25	35.25	52.00	40.75	45.25	27.00	27.50	27.50
Sheets	41.00	41.25	43.25	43.25	57.00	49.25	53.75	36.50	37.00	39.00
Strip, hot-rolled	26.50	28.25	32.50	30.25	48.75	37.00	41.25	23.50	30.25	24.00
Strip, cold-rolled	34.00	36.75	40.25	38.75	59.00	48.25	52.25	30.50	37.00	31.00

STAINLESS STEEL PRODUCING POINTS—*Sheets*: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; McKeesport, Pa., *U1*; Washington, Pa., *W2*; (type 316 add 4.5¢) *J2*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*; Ft. Wayne, *J4*; Lockport, N. Y., *R4*.

Strip: Midland, Pa., *C11*; Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; (type 316 add 4.5¢); W. Leechburg, Pa., *A3*; Bridgeville, Pa., *U2*; Detroit, *M2*; Canton-Massillon, O., *R3*; Middletown, O., *A7*; Harrison, N. J., *D3*; Youngstown, *C5*; Lockport, N. Y., *S4*; Sharon, Pa., *S1* (type 301 add ½¢); Butler, Pa., *A7*; Wallingford, Conn., *W1*.

Bars: Baltimore, *A7*; Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa., *J2*; McKeesport, Pa., *U1*, *F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R3*; Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Lockport, N. Y., *S4*; Canton, O., *T5*; Ft. Wayne, *J4*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Harrison, N. J., *D3*; Baltimore, *A7*; Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*.

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*.

Plates: Brackenridge, Pa., *A3* (type 416 add ½¢); Butler, Pa., *A7*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Lockport, N. Y., *S4*; Middletown, *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*.

Forged discs, die blocks, rings: Pittsburgh, *C11*; Syracuse, *C11*; Ferndale, Mich., *A3*; Washington, Pa., *J2*.

Forging billets: Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3*; Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*.

ALLEGHENY LUDLUM—Slightly higher on Type 301; slightly lower on others in 300 series.

WASHINGTON STEEL—Slightly lower on 300 series except where noted.

UNIVERSITY OF MICHIGAN LIBRARIES

PIPE AND TUBING

Base discounts f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS					
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½-3 In.		3½-4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	34.0	12.0	37.0	16.0	39.0	19.5	40.0	20.0	40.5	21.0	41.0	21.5	41.5	22.0	....	....	....	....	....	....
Youngstown *R3*	36.0	14.0	39.0	18.0	41.5	21.5	42.9	22.0	42.5	23.0	43.0	23.5	43.5	24.0	....	....	....	....	....	....
Oakland *K1*	25.0	3.0	28.0	7.0	30.5	10.5	31.0	11.0	31.5	12.0	32.0	12.5	32.5	13.0	....	....	....	....	....	....
Pittsburgh *J3*	36.0	14.0	39.0	17.0	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	29.5	8.0	32.5	11.5	34.5	13.5
Pittsburgh *N2*	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5	34.5	14.5
Alton Ill. *L1*	35.0	13.0	38.0	17.0	40.5	20.5	41.0	21.0	41.5	22.0	42.0	22.5	42.5	23.0	....	....	....	....	....	....
Sharon *M3*	36.0	13.0	39.0	17.0	41.5	20.0	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.0	....	....	....	....	....	....
Pittsburgh *N1*	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	....	32.5	....	34.5	....
Wheeling *W5*	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	....	....	....	....	....	....
Wheatland *W4*	36.0	14.0	39.0	17.0	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	....	....	....	....	....	....
Youngstown *Y1*	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5	34.5	14.5
Indiana Harbor *Y1*	35.0	13.0	38.0	17.0	40.5	20.5	41.0	21.0	41.5	22.0	42.0	22.5	42.5	23.0	....	....	....	....	....	....
Lorain *N2*	36.0	19.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5	34.5	14.5
EXTRA STRONG PLAIN ENDS																				
Sparrows Pt. *B3*	33.5	13.0	37.5	17.0	39.5	20.5	40.0	21.0	40.5	22.0	41.0	22.5	41.5	23.0	....	....	....	....	....	....
Youngstown *R3*	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	....	....	....	....	....	....
Oakland *K1*	24.5	4.0	28.5	8.0	30.5	11.5	31.0	12.0	31.5	13.0	32.0	13.5	32.5	14.0	....	....	....	....	....	....
Pittsburgh *J3*	35.5	13.5	39.5	17.5	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	29.0	7.5	33.0	12.0	36.5	15.5
Pittsburgh *N2*	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	10.0	33.0	14.0	36.5	17.5
Alton, Ill. *L1*	32.5	12.0	36.5	16.0	38.5	19.5	39.0	20.0	39.5	21.0	40.0	21.5	40.5	22.0	....	....	....	....	....	....
Sharon *M3*	35.5	14.0	39.5	18.0	41.5	21.0	42.0	21.5	42.5	22.0	43.0	22.5	43.5	23.0	....	....	....	....	....	....
Pittsburgh *N1*	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	....	33.0	....	36.5	....
Wheeling *W5*	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	....	....	....	....	....	....
Wheatland *W4*	35.5	13.5	39.5	17.5	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	....	....	....	....	....	....
Youngstown *Y1*	35.5	15.0	39.5	19.0	41.0	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	26.0	29.0	10.0	33.0	14.0	36.5	17.5
Indiana Harbor *Y1*	34.5	14.0	38.5	18.0	40.5	21.0	41.0	22.0	41.5	23.0	42.0	23.5	42.5	24.0	....	....	....	....	....	....
Lorain *N2*	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	10.0	33.0	14.0	36.5	17.5

Galvanized discounts based on zinc, at 17¢ per lb, East St. Louis. For each 1¢ change in zinc, discounts vary as follows: ½ in., ¾ in., and 1 in., 1 pt.; 1¼ in., 1½ in., 2 in., ¾ pt.; 2½ in., 3 in., ½ pt. Calculate discounts on even cents per lb of zinc, i.e., if zinc is 16.51¢ to 17.50¢ per lb, use 17¢. Jones & Laughlin discounts apply only when zinc price changes 1¢.

Threads only buttweld and seamless, 1 pt. higher discount. Plain ends, buttweld and seamless, 3 in. and under, 3½ pts. higher discount. Buttweld jobbers' discount, 5 pct. East St. Louis zinc price now 13.5¢.

COKE

	Net-Ton
Furnace, beehive (f.o.b. oven)	
Connellsville, Pa.	$14.50 to $15.00
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	$17.50 to $18.00
Foundry, oven coke	
Buffalo, del'd	$26.58
Chicago, f.o.b.	23.00
Detroit, f.o.b.	24.00
New England, del'd	24.80
Seaboard, N. J., f.o.b.	22.75
Philadelphia, f.o.b.	22.70
Swedeland, Pa., f.o.b.	22.60
Painesville, Ohio, f.o.b.	24.00
Erie, Pa., f.o.b.	23.50
Cleveland, del'd	25.72
Cincinnati, del'd	25.06
St. Paul, f.o.b.	22.50
St. Louis	25.40
Birmingham, del'd	21.69
Neville Island	23.00

ELECTRICAL SHEETS

22 Ga. H-R cut length F.o.b. Mill Cents Per Lb.	Armature	Elec.	Meter	Dynamo	Transf. 72	Transf. 65	Transf. 58
Beech Bottom *W5*	....	7.25	8.50	9.30	9.85	10.40	11.10
Brackenridge *A3*	....	7.25	8.50	9.30	9.85	....	....
Granite City *G2*	....	7.95	9.20	....	....	....	....
Ind. Harbor *I3*	6.75	7.25	....	....	....	....	....
Mansfield *E2*	7.25	7.75	9.00	9.80	....	....	....
Niles, O. *N3*	7.05	7.55	....	....	....	....	....
Vandergrift *U1*	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Warren, O. *R3*	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Zanesville *A7*	6.75	7.25	8.50	9.30	9.85	10.40	11.10

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges

Producing Point	Basic	Foundry	Malleable	Bessemer	Low Phos.	Bl. Furnace Silvery	Low Phos. Charcoal
Bethlehem *B3*	54.00	54.50	55.00	55.50	....	....	....
Birmingham *R3*	48.38	48.88	....	....	....	....	....
Birmingham *W9*	48.38	48.88	....	....	....	....	....
Birmingham *S5*	48.38	48.88	....	....	....	....	....
Buffalo *R3*	52.00	52.50	53.00	....	....	....	....
Buffalo *H1*	52.00	52.50	53.00	....	....	63.75	....
Chicago *I4*	52.00	52.50	52.50	53.00	....	....	....
Cleveland *A5*	52.00	52.50	52.50	53.00	57.00	....	....
Cleveland *R3*	52.00	52.50	52.50	....	....	....	....
Daingerfield, Tex. *L3*	48.00	48.50	48.50	....	....	....	....
Duluth *I4*	52.00	52.50	52.50	53.00	....	....	....
Erie *I4*	52.00	52.50	52.50	53.00	....	....	....
Everett, Mass. *M6*	....	59.75	60.25	....	....	....	....
Fontana *K1*	58.00	58.50	....	....	....	....	....
Geneva, Utah *U1,Y1*	52.00	52.50	52.50	53.00	....	....	....
Granite City, Ill. *K3*	53.90	54.40	54.90	....	....	....	....
Hubbard, Ohio *Y1*	52.00	52.50	52.50	....	....	....	....
Ironton Utah *C7*	52.00	52.50	....	....	....	....	....
Jackson, Ohio *J1,G1*	....	....	....	....	....	62.50	....
Lyle, Tenn. *T3*	....	....	....	....	....	....	66.00
Monessen *P6*	54.00	....	....	....	....	....	....
Neville Island *P4*	52.00	52.50	52.50	53.00	....	....	....
Pittsburgh *U1*	52.00	....	....	53.00	....	....	....
Sharpsville *S3*	52.00	52.50	52.50	53.00	....	....	....
Steelton *B3*	54.00	54.50	55.00	55.50	60.00	....	....
Swedeland *A2*	56.00	56.50	57.00	57.50	....	....	....
Toledo *I4*	52.00	52.50	52.50	53.00	....	....	....
Troy, N. Y. *R3*	54.00	54.50	55.00	....	60.00	....	....
Youngstown *Y1*	52.00	52.50	52.50	53.00	....	....	....
N. Tonawanda, N. Y. *T1*	....	52.50	53.00	....	....	....	....

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base, (1.75 to 2.25 pct, except low phos., 1.75 to 2.00 pct), 50¢ per ton for each 0.50 pct manganese over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Subtract 38¢ per ton for phosphorus, content 0.70 pct and over. Silvery Iron: Add $1.50 per net ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. $1 per ton for 0.75 pct or more phosphorus, manganese as above. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	22.67	26.66	21.99	25.66
	2½	12	30.48	35.84	29.57	34.78
	3	12	33.90	39.99	32.89	38.70
	3½	11	42.37	49.89	41.10	48.39
	4	10	52.60	61.88	51.03	60.02
National Tube	2	13	21.62	26.48	....	....
	2½	12	29.65	36.32	....	....
	3	12	34.00	41.64	....	....
	3½	11	40.34	49.41	....	....
	4	10	51.21	62.72	....	....
Pittsburgh Steel	2	13	....	27.08	....	....
	2½	12	30.49	37.15	....	....
	3	12	34.95	42.50	....	....
	3½	11	41.48	50.54	....	....
	4	10	52.65	64.16	....	....

CAST IRON WATER PIPE

	Per Net Ton
6 to 24-in., del'd Chicago	$105.30 to $108.80
6 to 24-in., del'd N.Y.	108.50 to 109.50
6 to 24-in., Birmingham	91.50 to 96.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipments; rail and water shipments less	$123.00 to $130.00

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

C-R SPRING STEEL

Cents Per Lb. F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Bridgeport, Conn. *S7*	5.35	6.60	7.40	9.35	11.65
Carnegie, Pa. *S9*	....	6.80	7.40	9.35	11.65
Cleveland *A5*	4.65	6.45	7.40	9.35	11.65
Detroit *D1*	5.60	6.65	7.25	....	....
New Castle, Pa. *B4*	5.35	6.80	7.40	9.35	....
New Haven, Conn. *D1*	5.85	6.75	7.35	....	....
Sharon Pa. *S1*	5.35	6.80	7.40	9.35	11.65
Weirton, W. Va. *W3*	5.35	6.80	7.40	9.35	11.65
Worcester, Mass. *A5*	4.95	6.75	7.70	9.65	11.95
Youngstown *C5*	....	6.80	7.40	9.35	11.65

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Base Col.	Woven Wire Fence 9-15½ ga. Base Col.	Fence Posts Base Col.	Single Loop Bale Ties Base Col.	Twisted Barbless Wire Base Col.	Galv. Barbed Wire Base Col.	Merch. Wire Ann'ld ¢/lb.	Merch. Wire* Galv. ¢/lb.
Alabama City *R3*	118	126	....	123	....	136	5.70	5.95
Aliquippa, Pa. *J3*	118	132	....	....	136	140	5.70	6.15
Atlanta *A8*	121	133	....	126	126	143	5.95	6.40
Bartonville *K2*	118	130	....	123	143	143	5.70	6.15
Buffalo *W6*	....	....	....	....	....	....	4.85	....
Cleveland *A6*	125	....	....	....	....	....	....	....
Cleveland *A5*	....	....	....	....	....	....	5.70	6.10
Crawfordsvl. *M4*	....	132	....	....	....	145	5.95	6.40
Donora, Pa. *A5*	118	130	....	123	140	140	5.70	6.15
Duluth *A5*	118	130	....	123	140	140	5.70	6.15
Fairfield, Ala. *T2*	118	130	....	123	....	140	5.70	6.15
Houston *S2*	126	138	....	....	....	148	6.10	6.55
Johnstn., Pa. *B3*	118	130	....	....	140	....	5.70	6.15
Joliet, Ill. *A5*	118	130	....	123	....	140	5.70	6.15
Kokomo, Ind. *C9*	120	132	....	125	138	142	5.80	6.05
Los Angeles *B2*	....	....	....	....	....	....	6.45	....
Kansas City *S2*	130	....	....	135	....	152	6.30	6.75
Minnequa *C6*	123	138	130	128	146	146	5.95	6.45
Monessen *P6*	124	135	....	....	....	145	5.95	6.40
Moline, Ill. *R3*	....	....	136	....	....	....	....	....
Pittsburg, Cal. *C7*	137	....	....	147	156	160	6.65	6.80
Portsmouth *P7*	124	137	....	....	147	147	6.10	6.60
Rankin Pa. *A5*	118	130	....	....	140	140	5.70	6.15
So. Chicago *R3*	118	126	140	123	....	136	5.70	5.95
S. San Fran. *C6*	....	....	....	147	....	160	6.65	7.10
Sparrows Pt. *B3*	120	....	....	125	142	142	5.80	6.25
Sterling, Ill. *N4*	118	130	....	123	140	140	5.70	6.15
Struthers, O. *Y1*	....	....	....	....	....	....	5.70	6.15
Torrance, Cal. *C7*	138	....	....	....	....	....	6.65	....
Worcester *A5*	124	....	....	....	....	....	6.00	6.45
Williamsport, Pa. *S10*	....	....	150	....	....	....	....	....

Cut Nails, carloads, base $7.35 per 100 lb. (less 20¢ to jobbers), at Conshohocken, Pa., (*A2*), Wheeling, W. Va., (*W5*), $7.15.

* Alabama City and So. Chicago don't include zinc extra

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Axles	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer *U1*	3.60	4.00	4.70					
Chicago *R3*				6.15				
Cleveland *R3*						9.35		
Ensley *T2*	3.60	4.00					4.50	9.80
Fairfield *T2*		4.00	4.70	6.15	5.60		4.50	
Gary *U1*	3.60	4.00						
Ind. Harbor *I3*	3.60		4.70	6.15	5.60		4.50	
Johnstown *B3*		4.00			5.60			
Joliet *U1*		4.00	4.70					
Kansas City *S2*				6.40				9.85
Lackawanna *B3*	3.60	4.00	4.70				4.50	
Lebanon *B3*				6.15		9.35		9.85
Minnequa *C6*	3.60	4.50	4.70	6.15			4.50	9.85
Pittsburgh *R3*						9.35		
Pittsburgh *O1*						9.35		9.85
Pittsburgh *P5*								9.85
Pittsburgh *J3*				6.15				
Pitt'g., Cal. *C7*							4.65	
Seattle *B2*				6.65			4.65	
Steelton *B3*	3.60		4.70				4.50	
Struthers *Y1*				6.15				
Torrance *C7*							4.65	
Youngstown *R3*				6.15				

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	$1.505
18	4	1	—	5	$2.13
16	4	2	—	—	$1.65
1.5	4	1.5	8	—	81.0¢
6	4	2	6	—	96.5¢

High-carbon chromium ..... 63.5¢
Oil hardened manganese ..... 35¢
Special carbon ..... $2.5¢
Extra carbon ..... 27¢
Regular carbon ..... 23¢

Warehouse prices on and east of Mississippi are 3.5¢ per lb. higher. West of Mississippi, 5.5¢ higher.

CLAD STEEL

	Plate	Sheet
Stainless-carbon		
No. 304, 20 pct.		
Coatesville, Pa. *L4*	*29.5	
Washington, Pa. *J2*	*29.5	
Claymont, Del. *C4*	*28.00	
Conshohocken, Pa. *A2*		*27.50
New Castle, Ind. *I2*	*29.77	*26.24
Nickel-carbon		
10 pct Coatesville, Pa. *L4*	32.5	
Inconel-carbon		
10 pct Coatesville, Pa. *L4*	40.5	
Monel-carbon		
10 pct Coatesville, Pa. *L4*	33.5	
No. 302 Stainless-copper stainless, Carnegie, Pa. *A4*		77.00
Aluminized steel sheets, hot dip, Butler, Pa. *A7*		7.75

* Includes annealing and pickling, or sandblasting.

ELECTRODES

Cents per lb, f.o.b., plant threaded electrodes with nipples, unboxed

Diam. in in.	Length in in.	Cents Per lb.
	GRAPHITE	
17, 18, 20	60, 72	17.85
8 to 16	48, 60, 72	17.85
7	48, 60	19.57
6	48, 60	20.95
4, 5	40	21.50
3	40	22.61
2½	24, 30	23.15
2	24, 30	25.36
	CARBON	
40	100, 110	8.03
35	65, 110	8.03
30	65, 84, 110	8.03
24	72 to 104	8.03
20	84, 90	8.03
17	60, 72	8.03
14	60, 72	8.57
10, 12	60	8.84
8	60	9.10

FLUORSPAR

Washed gravel, f.o.b. Rosiclaire, Ill. Price, net ton; Effective CaF_2 content:
70% or more $43.00
60% or less 40.00

The SCALE that launched a thousand IDEAS!

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Through custom-engineering ... Toledo applies the basic principles of weighing accuracy to a constantly growing range of force-measuring, balancing, counting, classifying, testing and control applications. Each of these devices is custom-engineered to meet a specific problem. Engineering and manufacturing facilities distinct from standard production have been provided. Consult the Toledoman who calls on you —or write, outlining your problem, directly to Custom-Sales Department, Toledo Scale Company, Toledo 1, Ohio.

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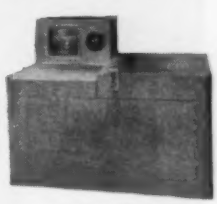
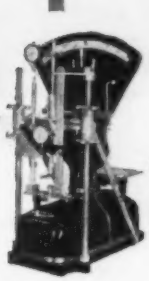
AUTOMATIC BATCH CONTROL



CLASSIFYING TO PREDETERMINED STANDARDS



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SERVICE Factory-Trained 200 Cities

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HEADQUARTERS FOR SCALES

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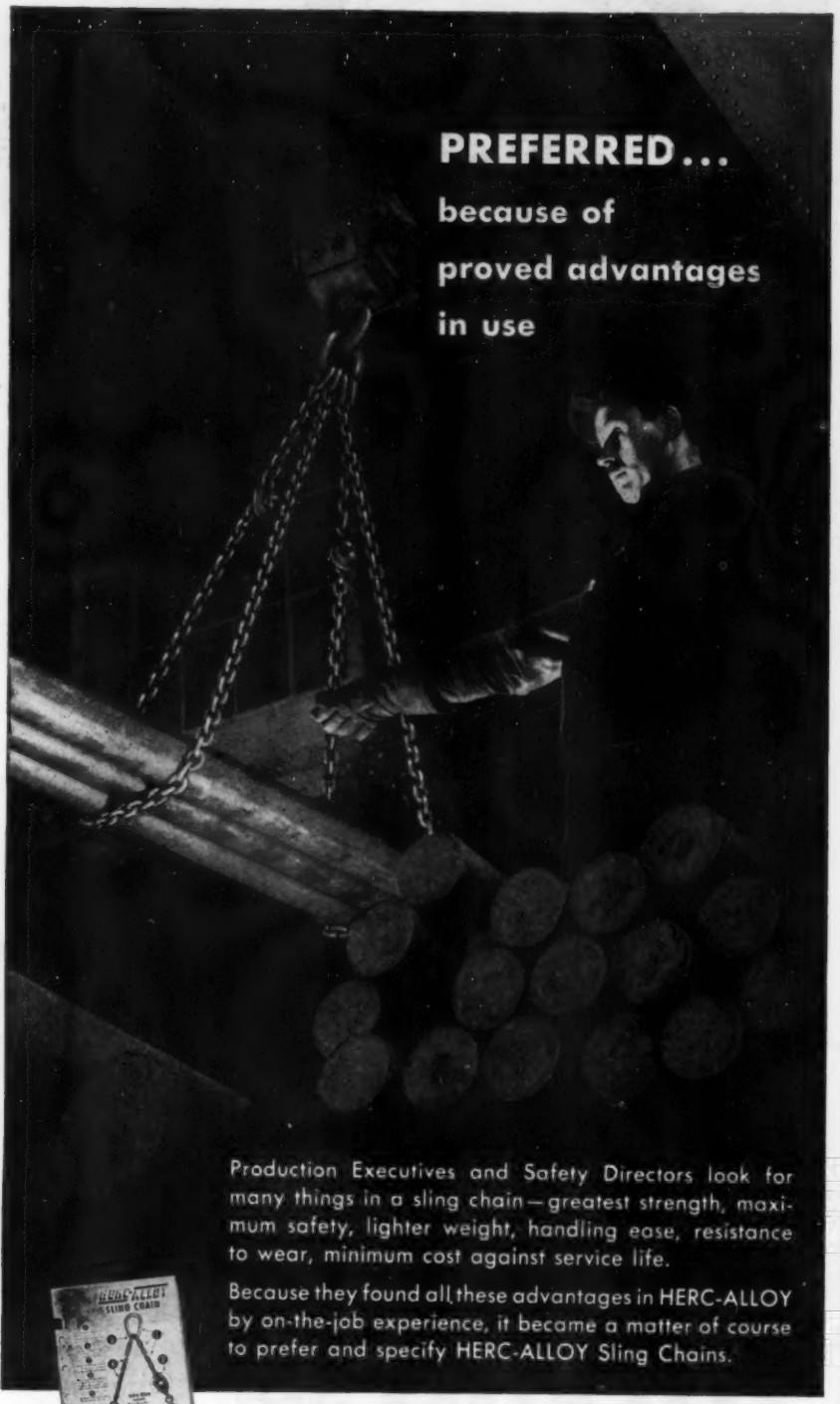
SLING CHAINS



Production Executives and Safety Directors look for many things in a sling chain—greatest strength, maximum safety, lighter weight, handling ease, resistance to wear, minimum cost against service life.

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Write for illustrated Data Book No. 3 which contains helpful information on sling chain selection and use.

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(Affiliated with Chisholm-Moore Hoist Corp.)
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District Offices: New York • Chicago • Cleveland
Other Factories at Angola, N. Y., Dixon, Ill., St. Catharines, Ont., Can., and Johannesburg, South Africa.

—Miscellaneous Prices

BOLTS, NUTS, RIVETS, SCREW...

Consumer Prices
(Base, discount, f.o.b. mill, Pittsburgh, Cleveland, Birmingham or Chicago)

Nuts, Hot Pressed, Cold Punched—Sq.

	Pct Off List			
	Less Keg.	K. Reg.	Less Keg.	K. Hvy.
½ in. & smaller.	15	28½	15	28½
9/16 in. & ⅝ in.	12	25	6½	21
¾ in. to 1½ in. inclusive	9	22	1	16½
1⅝ in. & larger.	7½	22	1	16½

Nuts, Hot Pressed—Hexagon

½ in. & smaller.	26	37	22	34
9/16 in. & ⅝ in..	16½	29½	6½	21
¾ in. to 1½ in. inclusive	12	25	3	17½
1⅝ in. & larger.	8½	23	2	17½

Nuts, Cold Punched—Hexagon

½ in. & smaller.	26	37	22	34
9/16 in. & ⅝ in..	23	35	17½	30½
¾ in. to 1½ in. inclusive	19½	31½	12	25
1⅝ in. & larger.	8½	23	2	17½

Nuts, Semi-Finished—Hexagon

	Reg.		Hvy.	
½ in. & smaller.	35	45	28½	29½
9/16 in. & ⅝ in.	23	35	17½	30½
¾ in. to 1½ in. inclusive	24	36	15	26½
1⅝ in. & larger.	13	26	8½	23
	Light			
7/16 in. & smaller	35	45		
½ in. thus ⅝ in.	28½	39½		
¾ in. to 1½ in. inclusive	26	37		

Stove Bolts *Pct Off List*

Packaged, steel, plain finished.	48—10
Packaged, plate finish	31—10
Bulk, plain finish**	62*

*Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.

**Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.

Rivets *Base per* 100 lb

½ in. & larger	$7.85

Cap and Set Screws

(In bulk)	*Pct Off List*
Hexagon head cap screws, coarse or fine thread, ¼ in thru ⅝ in. x 6 in., SAE 1020, bright	54
¾ in. thru 1 in. up to & including 6 in.	45
¼ in. thru ⅝ in. x 6 in. & shorter high C double heat treat	46
¾ in. thru 1 in. up to & including 6 in.	41
Milled studs	35
Flat head cap screws, listed sizes....	16
Fillister head cap, listed sizes	34
Set screws, sq head, cup point, 1 in. diam. and smaller x 6 in. & shorter	53

Machine and Carriage Bolts

	Pct Off List Less Case	C.
½ in. & smaller x 6 in. & shorter	15	28½
9/16 in. & ⅝ in. x 6 in. & shorter	18½	30½
¾ in. & larger x 6 in. & shorter	17½	29½
All diam. longer than 6 in...	14	27½
Lag, all diam. x 6 in. & shorter	23	35
Lag, all diam. longer than 6 in.	21	33
Plow bolts	34	...

—Miscellaneous Prices—

REFRACTORIES

Fire Clay Brick *Carloads, per 1000*

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5) $94.60
No. 1 Ohio 88.00
Sec. quality, Pa., Md., Ky., Mo., Ill. 88.00
No. 2 Ohio 79.20
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50) 13.75

Silica Brick

Mt. Union, Pa., Ensley, Ala. $94.60
Childs, Pa. 99.00
Hays, Pa. 100.10
Chicago District 104.50
Western Utah and Calif. 111.10
Super Duty, Hays, Pa., Athens, Tex., Chicago 111.10
Silica cement, net ton, bulk, Eastern (except Hays, Pa.) 16.50
Silica cement, net ton, bulk, Hays, Pa. 18.70
Silica cement, net ton, bulk, Ensley, Ala. 17.60
Silica cement, net ton, bulk, Chicago District 17.60
Silica cement, net ton, bulk, Utah and Calif. 24.70

Chrome Brick *Per Net Ton*

Standard chemically bonded Balt., Chester $82.00

Magnesite Brick

Standard, Baltimore $104.00
Chemically bonded, Baltimore 93.00

Grain Magnesite *St. ¾-in. grains*

Domestic, f.o.b. Baltimore in bulk fines removed $62.70
Domestic, f.o.b. Chewalah, Wash., in bulk 36.30
in sacks 41.80

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio per net ton, bulk Midwest, add 10¢; Missouri Valley, add 20¢... $13.75

LAKE SUPERIOR ORES

51.50% Fe; natural content, delivered lower Lake ports. 1952 *prices not yet established.* 1951 *prices were:*

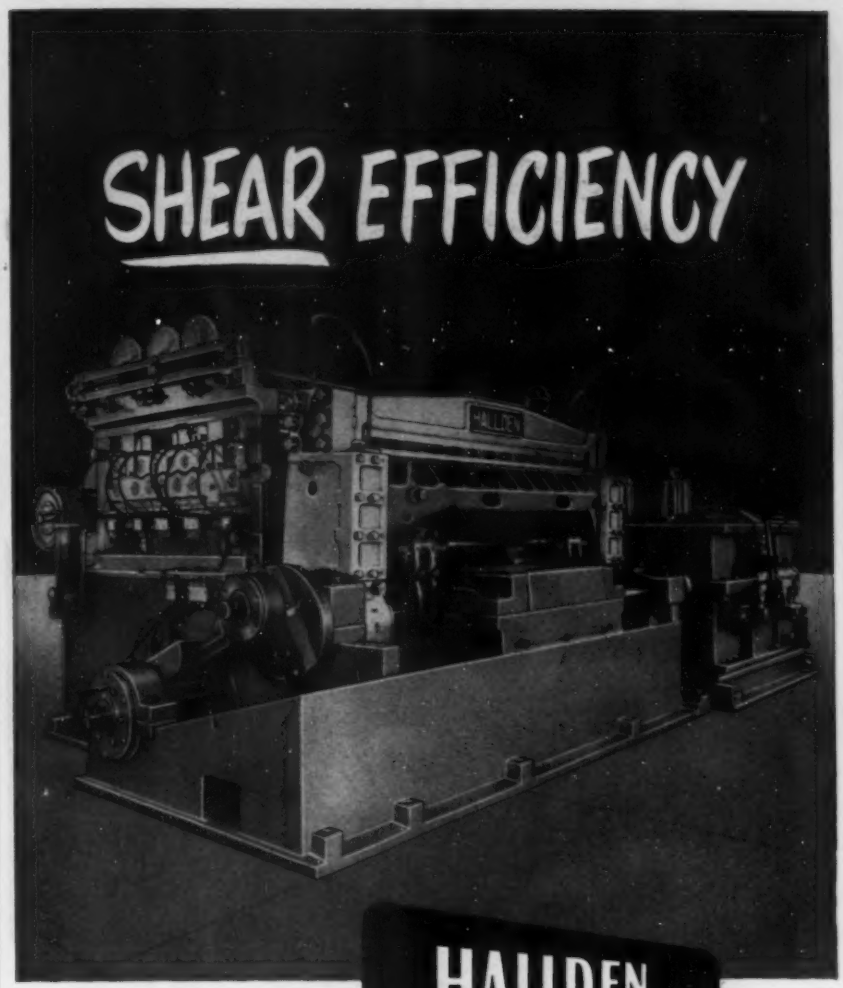
Old range, bessemer $8.70
Old range, nonbessemer 8.55
Mesabi, bessemer 8.45
Mesabi, nonbessemer 8.30
High phosphorus 8.30

After adjustments for analysis, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in Lake vessel rates, upper Lake rail freights, dock handling charges and taxes thereon.

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags .. 7.4¢ to 9.0¢
Canadian sponge iron, del'd, in East ..... 10.00¢
Domestic sponge iron, 98+% Fe, carload lots ..... 15.5¢ to 17.0¢
Electrolytic iron, annealed, 99.5+% Fe ..... 44.0¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe 60.0¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe. 63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+% Fe. 83.0¢ to $1.48
Aluminum ..... 31.5¢
Brass, 10 ton lots ..... 30.00¢ to 33.25¢
Copper, electrolytic. 10.75¢ plus metal value
copper, reduced ... 10.00¢ plus metal value
Cadmium, 100-199 lb. 95¢ plus metal value
Chromium, electrolytic, 99% min., and quantity, del'd $3.50
Lead ..... 7.5¢ to 12.0¢ plus metal value
Manganese ..... 57.0¢
Molybdenum, 99% $2.75
Nickel, unannealed ..... 88.0¢
Nickel, annealed ..... 95.0¢
Nickel, spherical, unannealed 92.0¢
Silicon ..... 38.5¢
Solder powder. .7.0¢ to 9.0¢ plus met. value
Stainless steel, 302 ..... 83.00¢
Stainless steel, 316 ..... $1.10
Tin ..... 14.00¢ plus metal value
Tungsten, 99% (65 mesh).. $6.00
Zinc, 10 ton lots ..... 23.0¢ to 30.5¢



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—Ferroalloy Prices—

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk in carloads delivered. (65-72% Cr, 2% max. Si.)

0.06% C	30.50	0.20% C	29.50
0.10% C	30.00	0.50% C	29.25
0.15% C	29.75	1.00% C	29.00
2.00% C			28.75
65-69% Cr, 4-9% C			32.00
62-66% Cr, 4-6% C, 6-9% Si			32.00

S. M. Ferrochrome

Contract price, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	21.60
Ton lots	23.75
Less ton lots	25.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

Carloads	27.75
Ton lots	30.05
Less ton lots	31.85

High-Nitrogen Ferrochrome

Low-carbon type: 67-73% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.14
0.50% max. C	1.10
9 to 11% C	1.08

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed; lump 4-in. x down, bulk 2-in. x down, 21.75¢ per lb of contained Cr plus 12.40¢ per lb of contained Si.

Bulk 1-in. x down, 21.90¢ per lb contained Cr plus 12.60¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, dump delivered.

30-33% Ca, 60-65% Si, 3.00% max. Fe.

Carloads	19.00
Ton lots	22.10
Less ton lots	23.60

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si

Carloads	20.00
Ton lots	22.30
Less ton lots	23.30

CMSZ

Contract price, cents per lb of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50.56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

Ton lots	20.75
Less ton lots	22.00

SMZ

Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

Ton lots	17.50
Less ton lots	19.50

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	16.50
Less ton lots	17.75

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.00
Ton lots to carload packed	19.00
Less ton lots	20.50

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size.

F.o.b. Niagara Falls, Alloy, W. Va., Ashtabua, O.	$225
F.o.b. Johnstown, Pa.	$227
F.o.b. Sheridan, Pa.	$225
F.o.b. Etna, Clairton, Pa.	$228

Add $2.80 for each 1% above 82% Mn, subtract $2.80 for each 1% below 78% Mn.

Briquets—Cents per pound of briquet, delivered, 66% contained Mn.

Carload, bulk	12.45
Ton lots, packed	14.05

Continued

Spiegeleisen

Contract prices gross ton; lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$84.00	$85.00
Pgh. or Chicago	84.00	85.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.
96% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	36.95
Ton lots	38.45

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	30.00
Ton lots	32.00
Less ton lots	34.00 to 37.00

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	28.45	30.30	31.50
0.07% max. C	27.95	29.80	31.00
0.15% max. C	27.45	29.30	30.50
0.30% max. C	26.95	28.80	30.00
0.50% max. C	26.45	28.30	29.50
0.75% max. C, 80-85% Mn, 5.0-7.0% Si	23.45	25.30	26.50

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn ..... 21.35¢

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max. C, deduct 0.2¢.

Carload bulk	11.40
Ton lots	13.05
Briquet, contract basis carlots, bulk delivered, per lb of briquet	12.65
Ton lots, packed	14.25

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $92.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $90.00. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

96% Si, 2% Fe	18.00
97% Si, 1% Fe	18.50

Silicon Briquets

Contract price, cents per pound of briquet bulk, delivered, 40% Si, 2 lb Si briquets.

Carloads, bulk	6.95
Ton lots	8.55

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump, bulk, carloads, delivered.

25% Si	20.00	75% Si	14.30
50% Si	12.40	85% Si	15.55
90-95% Si			17.00

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

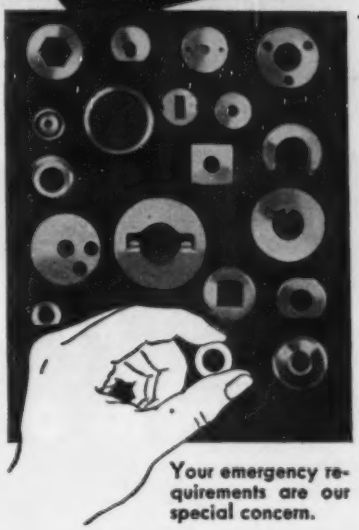
Ferrovanadium

35-55% contract basis, delivered, per pound, contained V.

Openhearth	$3.00-$3.10
Crucible	3.10- 3.20
High speed steel (Primos)	3.20- 3.25

Standard ..Specials

STEEL WASHERS FOR EVERY NEED



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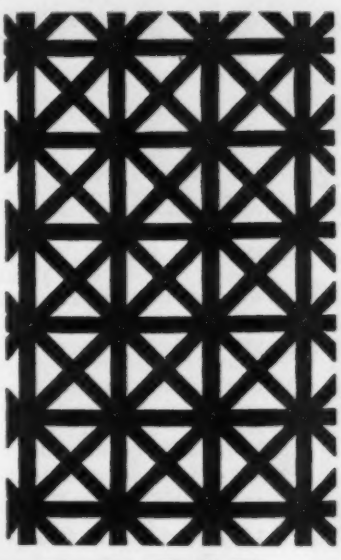

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LEBANON ALLOY AND STEEL castings

Other Ferroalloys

Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.	
Carloads	9.90
Ton lots	11.30
Calcium molybdate, 46.3-46.6% f.o.b. Langeloth, Pa., per pound contained Mo	$1.15
Ferrocolumbium, 50-60% 2 in. x D, contract basis, delivered per pound contained Cb.	
Ton lots	$4.90
Less ton lots	4.95
Ferro-Tantalum-Columbium, 20% Ta, 40% Cb, 0.30 C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta	$3.75
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo.	$1.32
Ferrophosphorus, electrolytic, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton	$65.00
10 tons to less carload	$75.00
Ferrotitanium, 40%, regular grade, 0.10% C max., f.o.b. Niagra Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti	$1.35
Ferrotitanium, 25%, low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti	$1.50
Less ton lots	1.55
Ferrotitanium, 15 to 18%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton	$177.00
Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W5, ton lots, delivered	$5.00
Molybdic oxide, briquets or cans, per lb contained Mo, f.o.b. Langeloth, Pa.	$1.14
bags, f.o.b. Washington, Pa., Langeloth, Pa.	$1.13
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Carload, bulk lump	14.50¢
Ton lots, bulk lump	15.75¢
Less ton lots, lump	16.25¢
Vanadium Pentoxide, 86-89% V_2O_5 contract basis, per pound contained V_2O_5	$1.28
Zirconium, 35-40%, contract basis f.o.b. plant, freight allowed, per pound of alloy.	
Ton lots	21.00¢
Zirconium, 12-15%, contract basis, lump, delivered, per lb of alloy.	
Carload, bulk	7.00¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B, 3-4%, Si, 40-45%, per lb contained B	$5.25
Bortam, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢
Corbortam, Ti, 15-21%, B, 1-2%, Si, 2-4%, Al, 1-2%, C, 4.5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.	
Ton lots, per pound	10.00¢
Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots. F.o.b. Wash., Pa.; 100 lb up	$1.20
10 to 14% B	.85
14 to 19% B	1.20
19% min. B	1.50
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.	
No. 1	$1.00
No. 6	68¢
No. 79	50¢
Manganese-Boron, 75.00% Mn, 15-20% B, 5% max. Fe. 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd	
Ton lots	$1.46
Less ton lots	1.57
Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered	
Less ton lots	$1.80
Silcaz, contract basis, delivered.	
Ton lots	45.00¢

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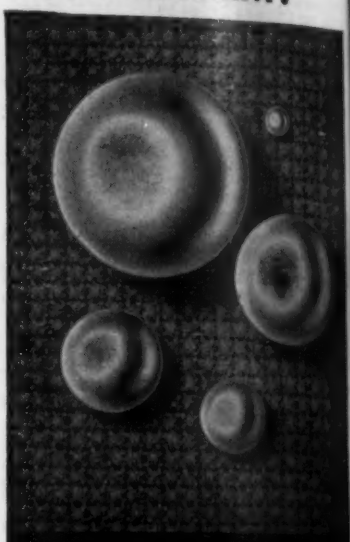

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